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ABSTRACT

Intended for the specialist in low vision rehabilitation, the manual provides information on low vision evaluation, low vision aids, and perceptual learning. A large section of the document is devoted to illustrations and information on (including use, cost, and source) 15 near and 8 distance vision aids such as the Coil Hi-Power Reader, hand magnifier, and 10x monocular. Also detailed are 19 lesson plans--each including lesson objective, description of materials used, source of materials, and procedure--covering such areas as simple form discrimination, coordination of tactual and visual skills, and improvement of reading speed and comprehension. Other sections are offered on vision testing (tests are described in terms of equipment, procedure, recording, relevance, and sources for material), ordering aids, the optometrist consultation, closed circuit television, educational training (which includes information on characteristics of eye diseases), and approximately 100 sources for low vision aids. (SB)

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INSTRUCTIONAL MANUAL
FOR
VISUAL SKILLS

Assembled by

Alice Wood

Western Blind Rehabilitation Center

Veterans Administration Hospital

Palo Alto. California

1975

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INTRODUCTION TO THIS MANUAL

The purpose of this manual is simply to introduce the new Low Vision Staff person to the Low Vision Department and to his or her duties as a low vision specialist. The manual is presented in the order a low vision specialist would work with a low vision student, starting from the student's arrival and working through his discharge date.

JOB DESCRIPTION OF THE LOW VISION SPECIALIST

A Low Vision Department was set up at the Western Blind Rehabilitation Center, for the simple reason that the majority of "blind" people in the country are not totally blind but rather have functional low vision. These low vision people, in the past, have not been able to get adequate evaluations, prescriptions, or training for their visual condition, through community resources. Many have been turned away from optometrists and opthalmologists with the hopeless feeling that they are "blind" and that there is nothing that can help them visually. The Low Vision Department at the Western Blind Rehabilitation Center feels many of these people can be helped, and makes an attempt to assist and train the low vision individual, so that he might use his remaining vision in the most effective manner.

Specifically, the job of the low vision specialist involves:

1. Testing the low vision person. Preferably one should use tests designed for a low vision evaluation in order to get accurate results. (These are discussed under "testing".)

2. Seeing that the low vision person gets to the qualified optometrist (who ideally specializes in low vision).

3. And lastly, trains the low vision person to use the visual aids prescribed for him, to his best possible functioning.

STUDENT WORKUP

FOLDERS

The first step in working with a student is to complete a folder for him. Within this folder you will want the following:

- record check list
- field chart
- Farnsworth chart (color vision)
- figure ground
- about five sheets of note paper for daily notes
- CCTV information sheet

(A sample folder can be found in the back.)

It is quite important that you keep your student's folder up to date with valid information. By doing this, you will have little difficulty knowing what he has been working on, and also will give his program continuity. In addition, a complete folder, will save a lot of time in writing staffing notes, orders, final reports, etc. When research is done, it is essential that all information be found in the student's folder in an organized manner. All folders are filed for research purposes.

A sample of the record check list follows.

LOW VISION EVALUATION SHEET

Date entered: ____________________

Name: ____________________ Age: __________ SS# ______________ C# ______________

Address: ________________________________ Telephone: ______________

Service connection: ______________% FTS# ______________

____

HISTORY

Diagnosis of eye condition: ______________________________________

Onset of eye problems: ______________________________________

Onset of legal blindness: ______________________________________

Physician's Report: ______________________________________

____

PREVIOUS TEST RESULTS

Distance acuity OD__________ OS__________ OU__________ Date:__________

OD__________ OS__________ OU__________ Date:__________

Near acuity OD__________ OS__________ OU__________ Date:__________

Fields

General Health: ______________________________________

____

Student Requests: ______________________________________

____

____

____

____

DISCUSSION WITH STUDENT

1. Attitude toward visual loss? ______________________________

2. What are you most interested in seeing? ______________________________

3. What can you read now? ______________________________

4. What are your vocational plans? ______________________________

5. Complaints?
   - sun bothers ____________ fading vision ____________
   - floaters ____________ double vision ____________
   - fluctuating vision ____________ other ____________

6. Present aides used? ______________________________

   present RX R ____________ add ____ R ____________ add ____

   L ____________ add ____ L ____________ add ____

7. Educational level? ____________ Work experience ____________

   Living situation ______________________________

TESTING

Distance acuity Lighting Conditions Date

Without Rx OD ________ OS ________ OU ______/____________/________

With Rx OD ________ OS ________ OU ______/____________/________

Near acuity Lighting Conditions Date

Without Rx OD ________ OS ________ OU ______/____________/________

With Rx OD ________ OS ________ OU ______/____________/________

Primary color discrimination: ____________ **Form** discrmination ____________

Farnsworth color test: ____________ **Figure ground test:** ____________

Fields: ______________________________

Aids on Loan:

INSTRUCTOR: ______________________________

GENERAL INFORMATION AND MEDICAL HISTORY

After making a folder for the student, past medical history should be looked up. This can be found in the student's medical folder kept in the ward clerk's office.

All information should be filled in the appropriate blanks on the record check list.

INITIAL STUDENT INTERVIEW

Evaluation of the student's present visual functioning starts at the most logical point -- with the student himself. His first contact with the low vision specialist is in the form of an informal interview. The purpose of the interview is to familiarize the student with the program, it is also important at this time to get an idea of the student's view of his visual loss.

Taking an accurate history of the student's condition is one of the essential first steps in the evaluation process. It is sometimes difficult for the student to describe how he sees, so it may help to ask him about specific tasks that he can or cannot perform. One note of caution is necessary here: Never put the student on the defensive about his condition. Try to make him as comfortable as possible. If you notice that certain questions upset him, avoid that type for the present. In many cases, the best technique is to let the student talk; you can usually direct the conversation without asking needlessly pointed questions. Remember that the student is likely to feel that his lack of vision makes him abnormal and he already spends a great deal of his time justifying his actions to the public and to himself.

In addition to the medical data found in the official records, a good history should include the following items:

1. What near vision tasks the student now performs--

   Can he read the newspaper articles or headlines? Does he read personal handwritten letters? Can he watch TV? Can he identify objects in snapshots or magazine pictures?

2. What are his expectations and goals--

   Some people have unrealistic goals about what aids can and cannot do. They may think that an aid will restore vision competely and allow them to function as well as the totally sighted. On the other hand, a person may see his loss of sight as absolute and complete and not even try to use his residual vision.

3. What has he been told about his condition--

   Many believe that their eyesight will decline if they use it. This fear is not always disspelled by the doctors, although it should be. Recent research reveals that there is no foundation for this belief.

4. What aids (if any) he now uses or has used in the past--

   Some people have met with failure in the use of aids and are now convinced that no aid can ever help them. Others have used aids previously which no longer work well for them. At any rate, re-evaluation of the aids is the recommended procedure.

The above initial interview can take the entire first period, spent with this student. It is essential to forming a good working relationship with the student, and also in planning a program to fit his specific needs. Also this interview will hopefully give the student confidence in you as an instructor, and inturn will give you (the instructor) insight into how to approach this student.

During the first initial interview, the student should be encouraged to discuss things about his vision that disturb him.

Very often bright sunlight is a strong complaint. If this is so, you should at this time issue aids, that might alleviate this problem. The following aids may be used:

Polaroid sunglasses

Slip-in-sunglasses (with built-in side shields), if the student wears prescription glasses already.

Clip on side shields

Clip on sunglasses

Visors

TESTING

DISTANCE ACUITY

Equipment: Feinbloom distance chart for subnormal vision
Snellen eye chart (Big E)
Direct light source (gooseneck lamp)
Occluder for individual eye testing

Procedure:

1. Using the Feinbloom chart, start testing at 10 feet.
2. Illuminate the chart with a floor stand gooseneck lamp (100 watt) at 3 feet from the chart. Test different levels of light. Use full candle power of a gooseneck lamp on the chart, and with the head of the lamp rotated 90 degrees for indirect light. Test with and without overhead lights, and vary the amount of overhead illumination. Record the lighting used in obtaining the best acuity. E.G. "Bright", "Dim", "Moderate", and "direct only", "overhead only".

   CAUTION: Avoid glare.
3. Test the student's worst eye first. Do this by occluding the better eye. The reason for this is to prevent memorization of the chart's numbers. After testing the poorer eye, go on and test the better eye alone and then both eyes together, in the following manner:
   - A. Show the student the largest test object. Ask him to say what numbers or letters he sees. After each correct answer go to the next smaller size.
   - B. When the student reaches the point of difficulty, where he can no longer identify the numbers or letters, the last correctly identified size is the acuity.

CAUTION: Often a student may miss a number or letter due to it being a particularly hard configuration. Do not stop with his first error, but instead go on to the next smallest numbers (or letters) and see if the student can identify them. Use AO Snellen chart for reading acuities that are not on the Feinbloom. Example: 20/50 20/15 20/10.

4. Should the student not be able to read the very largest number (the 700 foot number) move him closer to the chart, foot by foot, until he can. Then try smaller test numbers at this distance. Do without present Rx first, then with.

Recording:

In recording, let the numerator be the actual test distance in feet and the denominator the size of the test number as indicated on the test chart (example, 10/180), 10 is the distance from the chart and 180 is the number size. Also if there are 3 numbers on one page (all in one print size) and the student misses one of the tree it would be recorded as follows; 10/180 - 1. If the 700 size number is not recognized, even at one foot, try hand movements (HM), and record distance, light perception (LP), or record no light perception (NLP). To the right of the testing results, note testing date.

Note: ECCENTRIC VIEWING:

If the patient has a central blindspot have him try looking around the test number at various points on a clock. Indicate which eccentric viewing point was the most successful.

SOURCES FOR TESTING MATERIALS:

FEINBLOOM DISTANCE CHART

Designs for Vision
40 East 21st Street
New York City, New York 10010

Telephone: (212) 9[illegible]2-6060

AO SNELLEN EYE CHART

American Optical
2070 Dela Cruz Blvd.
Santa Clara, California 95050

Telephone: (408) 249-1400

TESTING

NEAR VISION ACUITY

Equipment: Sloan near vision reading cards
American Optical reading card (2M to .5M print)
Occluder
Typoscope
Meter tape measure

Procedure:

Test the poorer eye first. Occlude the better eye. Have the student hold the Sloan 10M card at the distance he feels he is able to read it the best. Varying the illumination until it is optimal, have the student try direct fixation, and if necessary, eccentric fixation until optimal vision is obtained. If the 10M Sloan card can be read, reduce the letter size until the smallest readable size is attained. Note: After reading the 2.5M print on the Sloan cards, you may switch to the American Optical card with prints ranging from 2M to .5M. Repeat this procedure for the other eye. Then both eyes together. Near acuity should be tested without and then with his present Rx.

Recording:

Mark: distance/print size

Example: .25/7M print (.25 is .25 meters, or 25 centimeters)

Sloan cards have the print size marked in the upper right hand corner. The larger the number the larger the print. .5M is the smallest and 10M the largest. In measuring distance record the distance from the corner of the eye to the card (if no glasses are worn).

If the student is wearing glasses you should measure from the frame edge to the card. Measure straight, not at an angle. Avoid parallax errors by looking perpendicularly at the ruler.

Note quality of reading: "Good", "Poor", "Great difficulty", etc. Judge on speed, fluency, errors, ability to correctly recognize large words, finding next line, and comprehension. To the right of the testing results, note the testing date.

SOURCES OF TESTING MATERIALS

	Approximate Prices (1973)
Sloan Near Vision Reading Cards	
Series I	$10.00
Series II (3rd grade level)	$ 5.00

John Hopkins University
School of Medicine
Wilmer Opthalmological Institute
Baltimore, Maryland 21205

American Optical Reading Card	
#11970	$ .50

American Optical Company
2070 Dela Cruz Blvd.
Santa Clara, California

Telephone: (408) 249-1400

Occluder	$ 2.25 per dozen

Watchmoket
232 West Exchange Street
Providence, Rhode Island 02903

Typoscope

Designs for Vision
40 East 21st Street
New York City, New York 10010

Telephone: (212) 982-6060

Meter Tape Measure (3 meter)	$ 2.00

Peninsula Scientific
2185 Park Blvd.
Palo Alto, California

Telephone: 326-4136

TESTING

PRIMARY COLORS

Equipment: Geometric Shape color cards
Direct light source

Procedure:

1. From the box of cards, take out 1 card of each color and then put them in the following order: Yellow, Orange, Red, Purple, Blue, Green. (Arranging the cards in the above order makes color discrimination more difficult and also tells whether the student is able to discriminate between colors that are near to each other in the color spectrum.)
2. Present the cards to the student in order and simply ask him to tell you what color he sees.

   NOTE: The student may or may not wish to use a bright light.

Recording:

Simply write down which colors the student confuses with which.

Example: Purple is brown. Blue was green.

Relevance:

Cones in the retina are responsible for color vision. Students with retinal damage may have great difficulty recognizing colors.

SOURCES FOR TESTING MATERIAL

Geometric Shape Color Cards

Teacher's Resources
100 Boyeston Street
Boston, Mass. 02116

TESTING

FORM DISCRIMINATION

Equipment: Geometric shape color cards
Direct light source

Procedure:

1. Choose one color group from the box of cards. Preferably choosing the color the student sees best (blue, red).
2. Give the cards to the student and ask him what forms he sees. If you suspect the student does no know the name of the forms, ask him what they look like. Example: Square is a box. You might also ask him how many sides each form has.

Recording:

Simply mark down if the student had difficulty or not, and if so, with which forms.

SOURCES OF TESTING MATERIAL

Geometric Shape Color Cards

Teacher's Resources
100 Boyeston Street
Boston, Mass. 02116

TESTING

FARNSWORTH COLOR TEST

Equipment: Farnsworth color test
Direct light source (Daylite bulb)
Occluder

Procedure:

1. Open the testing box and mix up all the colors.
2. Cover the student's good eye, doing the poorer eye first. If the poorer eye has a very low acuity, the student may not be able to do the test. Then proceed to the better eye.
3. Turn on the light and adjust over the test. Make sure the light is not directed at the student's eyes, but rather on the test.
4. Present the box to the student, and explain to him that the colors must be rearranged to form a type of "rainbow". The colors must be arranged to blend from one color into the next. It is important the student understand what you want him to do with this test. Often the simplest way to get the idea across is to tell the student to start on the left with the stable color circle and to find the one color in all the remaining colors, that looks the most like that stable one. Then to place it next to the stable one. Continue through all the colors, by asking which color looks the most like the last, if the student does not pick up the idea quickly.

Recording:

1. Record the results on the Farnsworth chart.

2. First flip the box over and mark the numbers down in the order the student arranged them, (on the proper blank). Mark that line either OD or OS, depending on which eye was tested.
3. Then transfer these numbers to one of the circles below (again mark that circle OD or OS).
4. The end results will either show a perfect circle (no errors) or crisscross lines predominantly going in one direction. This direction will determine whether the student has a protan, tritan, or duetan color defect.
5. Date the testing Result Chart.

SOURCES FOR TESTING MATERIALS	APPROXIMATE PRICES (1973)
Farnsworth Color Test	$90.00
Parson's Optical San Francisco, California	
Eye Patch (occluder) #OC [illegible]	$ .65
Western Optical 1200 Mercer Street Seattle, Washington 98109	
Luxo Lamp (Combo Model)	
Luxo Lamp Co. Monument Park Port Chester, New York 10573	$45.00

Name...Age.............Date..............................File No......................

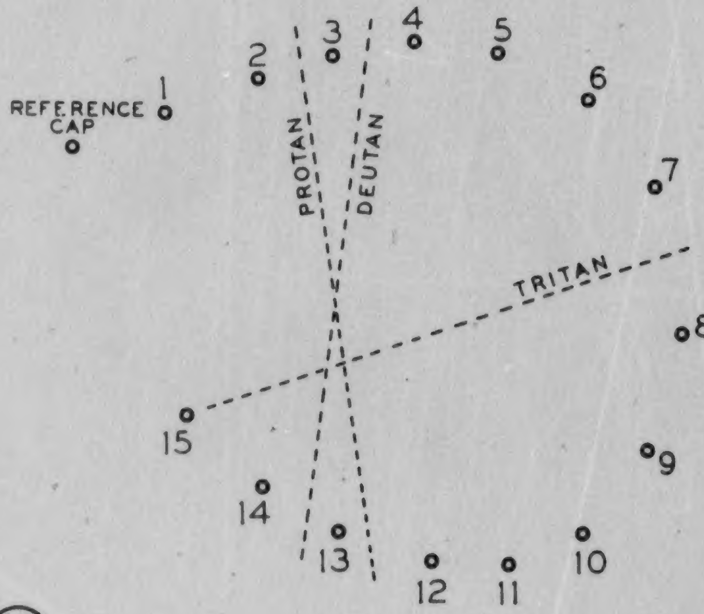
Department..Tester..

DICHOTOMOUS ANALYSIS

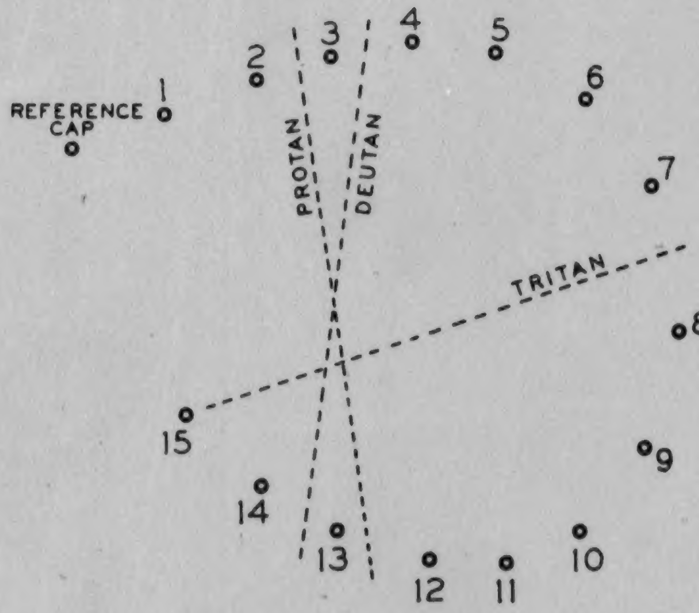
Type	Axis of Confusion			
PROTAN	(RED-bluegreen)	☐	PASS	☐
DEUTAN	(GREEN-redpurple)	☐		
TRITAN	(VIOLET-greenishyellow)	☐	FAIL	☐

Test Subject's Order	__	__	__	__	__	__	__	__	__	__	__	__	__	__	__
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Retest Subject's Order	__	__	__	__	__	__	__	__	__	__	__	__	__	__	__

TEST


REFERENCE CAP
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
PROTAN
DEUTAN
TRITAN

RETEST


REFERENCE CAP
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PROTAN
DEUTAN
TRITAN

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The Psychological Corporation, New York, N. Y. 10017

70-207S

FRIEDMANN FIELD ANALYZER

1. Turn On-Off switch in rear of machine on.
2. Set light filter knobs to 00 adjustment.
3. Turn "Front" light switch (above tube) on.
4. Turn off all room lights, and allow student time to adjust.
5. Student should rest his chin on the opposite side of the chin rest. from the eye being tested. (Example: right eye tested, chin should be on the left side of chin rest.) Occlude the eye not being tested.
6. Beginning with "A" position, flash the light once and ask the student how many lights he sees. If he sees the correct number note this and go on to "B". If the student does not see the correct number of light flashes, ask him at what position on a clock he does see flashes. Note the flashes he does and does not see. After finishing all letters, A though P, the results can be charted on the composite chart. (This will follow.) Then go on to the other eye.

NOTE: Emphasize fixation on the central target at all times.

TESTING

FIELDS - TANGENT SCREEN

Equipment: Tangent screen
Wands
Occluder
Charts for recording results
Meter ruler (tape)

Procedure:

1. Set the student in a chair in front of the tangent screen. Measure 100 centimeters (or 1 meter) from the screen to the corner of the eye. This is the distance the student should remain at, throughout the entire field test. Adjust the chair and student's position if necessary to achieve this distance. When adjusting the chair, make sure the student's central vision is directly in line with the center fixating dot. Also check to see that the tangent screen is at a level where the student's eye is directly parallel with the center fixating dot. (The student should not have to look up or down to fixate on the center dot, but directly across.)
2. Explain to the student that he must fixate on the center dot at all times. He must not look to the sides or up and down, or an incorrect reading will result. This often is difficult for low vision people and the student should be given a rest whenever necessary. Also, the instructor should pay close attention to the student's eye movements so that improper fixating can be detected and corrected **immediately**.
3. Field tests are done on the left and right eye separately, therefore you will want to occlude one eye (either left or right) and begin testing. When that eye is completed, go on and test the other.

It should be noted that if the student wears a distance correction, he should be allowed to use this correction in field testing. When the student wears bifocals, he should be told to only use the distance correction (top half).

4. Choose the correct wand size and mark the size down on the chart. Use the smallest wand possible that the student can see clearly. Often with floaters, a larger wand needs to be used. If the student has a central scotoma, the center dot will have to be replaced with a large X. Then ask the student to imagine the point where the two lines of the X come together, and fixate on that point.
5. Begin the field testing, by mapping out the natural blind spot. If you are testing the right eye, the blind spot will be on the right. If you are testing the left eye, the blind spot will be on the left. To map out the blind spot, slowly move the wand in from the outside. Mark the position where the student no longer sees the wand, and also where the wand becomes visible again. From the center of this blind area, go to the superior and inferior directions, finding out where the wand becomes visible. This blind spot which you have now mapped out, should fall very close to that stitched on the screen. By mapping out the natural blind spot, you can tell if the student is fixating correctly on the center dot. If the student is fixating properly, his blind spot should be very close to the natural blind spot. If this does not show, possibly the chair should be adjusted, distance adjusted, or fixation should be emphasized to the student again.

It should be noted that in certain eye diseases, the blind spot will be irregularly shaped and or enlarged.

6. Continue the field testing by covering the complete circle of the screen. Mark all areas where the student can see and all areas where the student cannot see. This is done by simply bringing in the wand (from off the screen) to the very center dot, and marking with pins. When a blind spot is found it should be mapped out immediately. This is done be finding the center of the blind spot, and then moving the wand upward and downward in different directions. Mark all spots checked by the upward or downward movement.
7. Ater the completion of the field test, chart the results. If the field is difficult to get, it is often best to do just a bit, then give the student a rest and chart that small portion done, while he is resting. This alleviates errors in charting due to incorrect reading of the pins.
8. If there were any particular difficulties in testing the field, these should be noted on the chart of the field.

Recording:

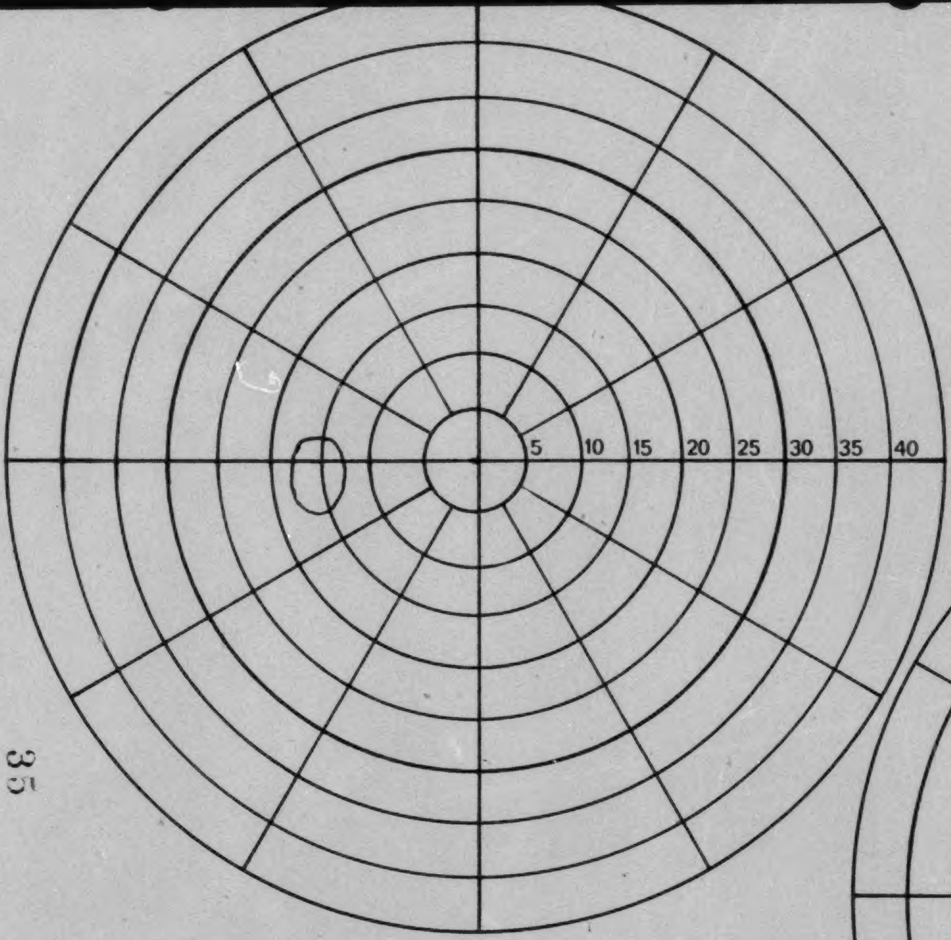
Record the results on a central field chart. Note the testing date on this chart.

SOURCES FOR TESTING MATERIALS	APPROXIMATE PRICE (1973)
Tangent Screen 1 meter or 2 meter	$58.00

Western Optical
1200 Mercer Street
Seattle, Washington

Field Wands - targets, large set, traquers scotometric targets (WO 229)		$37.50
	Bernell Manufacturers 316 S. Eddy Street South Bend, Indiana 46617 Telephone: (219) 234-3200	
3 meter Stanley Tape		$ 2.00
	Peninsula Scientific 2185 Park Blvd. Palo Alto, California Telephone: (415) 326-4136	
Occluder		$ .65 - $ .75
	Western Optical 1200 Mercer SI Seattle, Washington 98109	

Tangent Screen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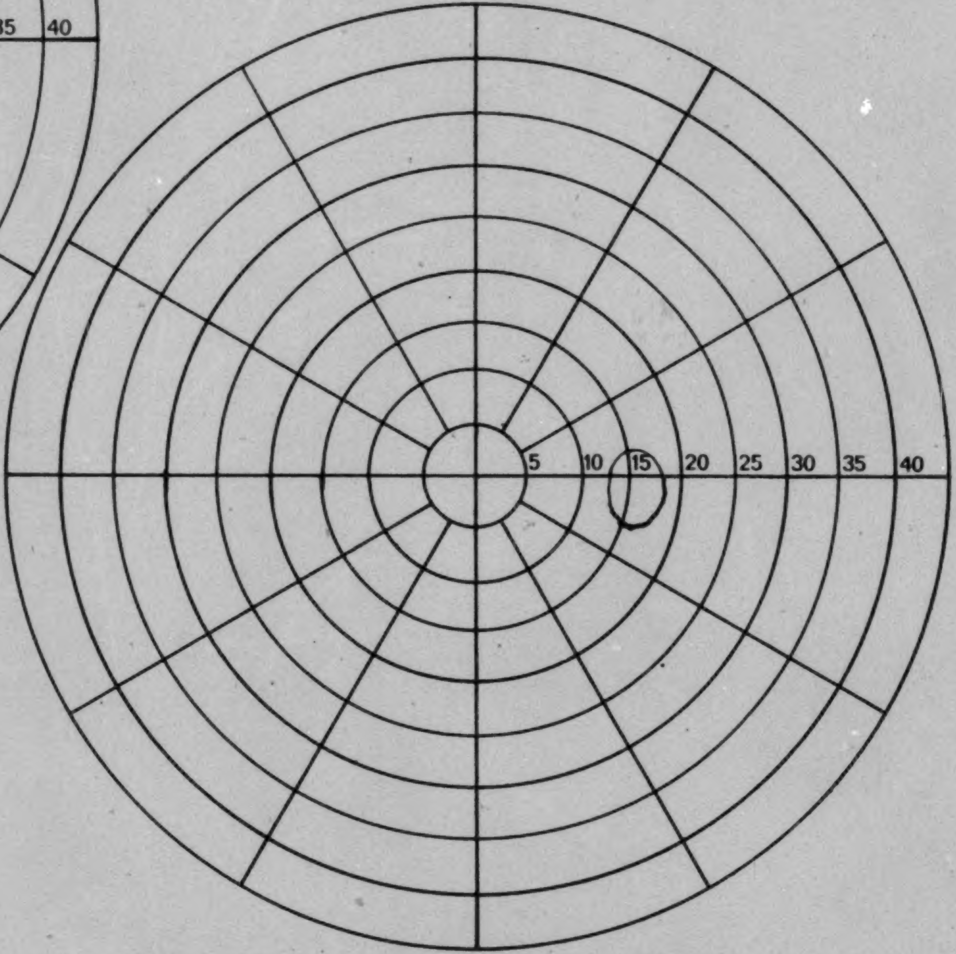
O.S.

O.D.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15
20
25
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35
40

NAME : ______________________

DATE : ______________________

T.S./D. : ______________________

FIGURE GROUND DISCRIMINATION

Equipment: Figure Ground Test
Good lighting
Four different color grease pencils or crayons

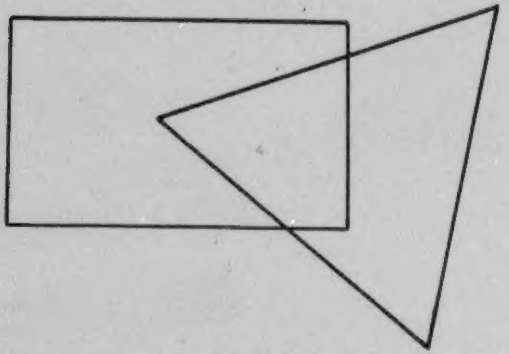
Procedure:

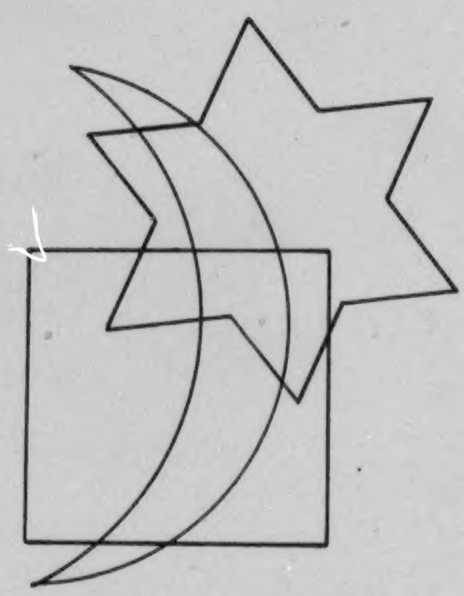
Present the test to the student and explain that you will ask him to identify the forms within each group of forms, and that you would like him to trace each form, each with a different color pencil or crayon.

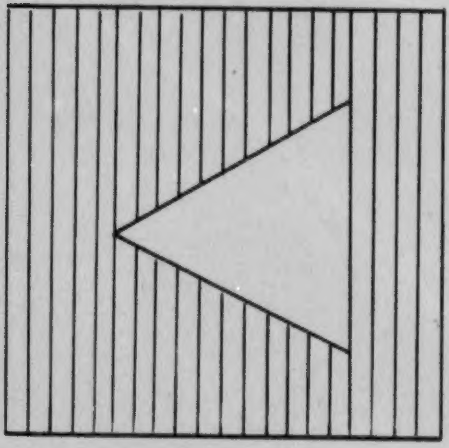
Recording:

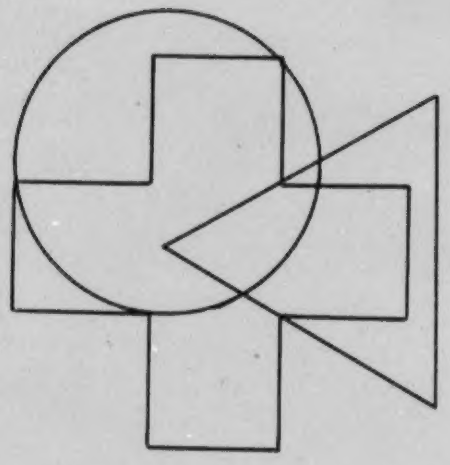
Simply place the test in the folder and make a note that the test was done.

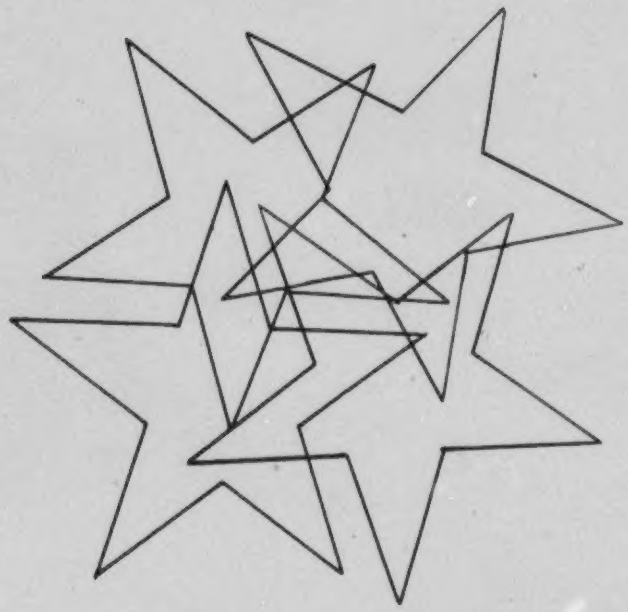
Figure Ground Test Part I

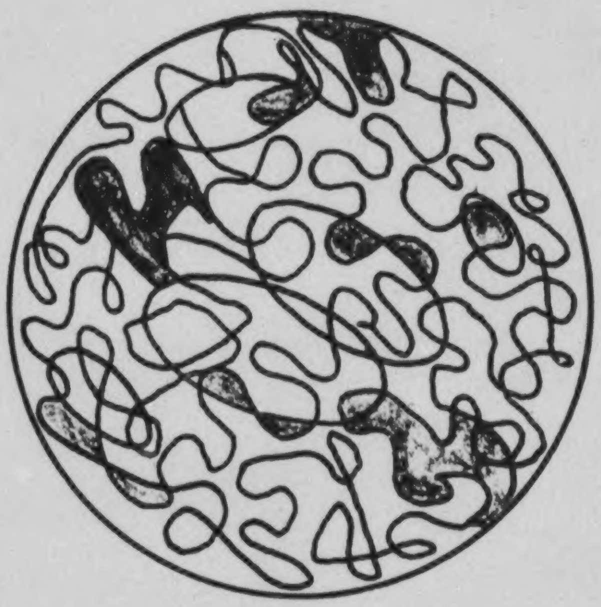


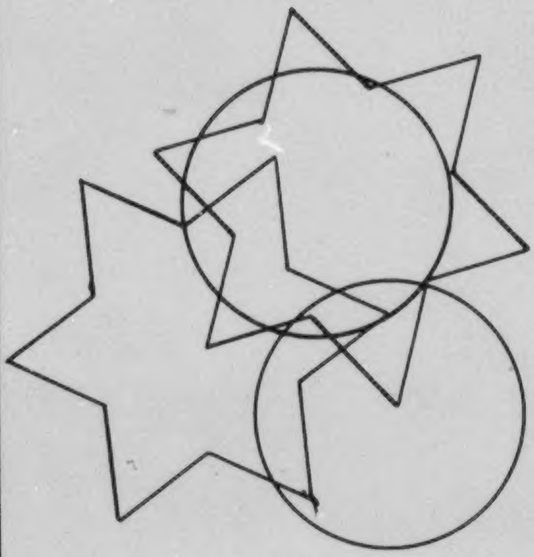


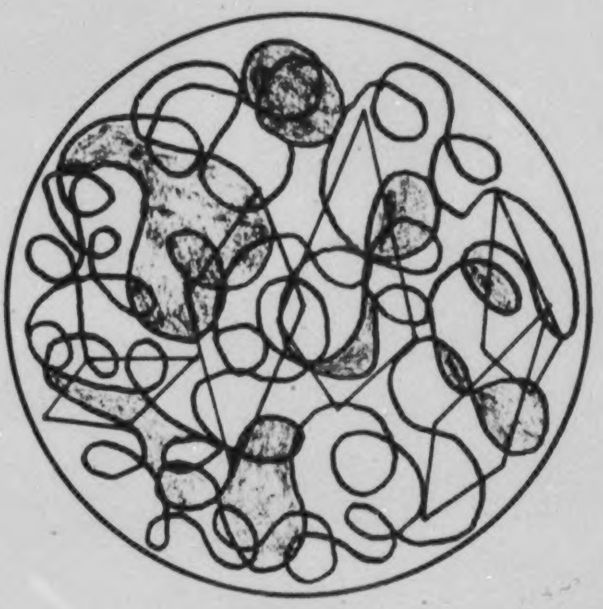












OPTOMETRIST CONSULT

CONSULTATION WITH OPTOMETRIST

The exam by the low vision consultant consists of:

1. Discussion with the student of his visual problems
2. Examination with the opthalmoscope - This is an instrument with a mirror centrally perforated for viewing the interior of the eye and especially the retina.
3. Examination with the retinascope - This instrument allows observation of the retina of the eye to determine the state of refraction.
4. Distance acuity should be checked and refraction done for distance. (The procedure for this is described in testing section.)
5. Near acuity should be checked and refraction done for reading purposes. (This procedure is described in the testing section.)
6. Trial with monocular or binocular

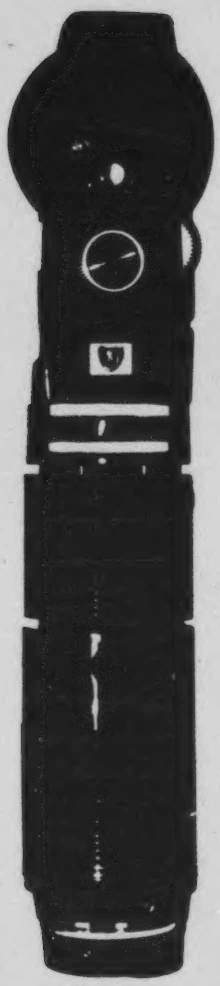
Usually the above is done in two 1½ hour sessions. This allows the low vision specialist time to work with the student between sessions, and also makes possible feedback to the low vision consultant on the student's progress.

Duties of the low vision specialist consist of:

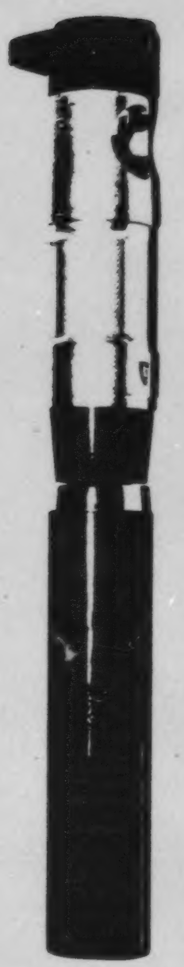
1. Getting the room set up for the exam (charts out, lights set-up, equipment out)
2. Scheduling students (with the clerk) and getting the medical and low vision folders together, for all student scheduled.
3. Going over medical and low vision folder with the low vision consultant, before the student arrives.

4. Aid the consultant in the low vision exam by answering questions, turning charts, locating aids and equipment, etc.
5. After the student leaves, write in the low vision folder all suggestions the consultant gives or tasks he would like completed.
6. It is then the responsibility of the low vision specialist to complete suggested tasks and schedule the student back for the second consultation, if necessary.

OPTHALMOSCOPE



RETINASCOPE



ORDERING
AIDS

ORDERING AIDS AND GLASSES FOR A PARTICULAR STUDENT

AIDS:

Fill out one 2431 Form or Prosthetic Request, along with two white tissue manifold carbon copies. See the following example for an explanation of how to fill out the form.

1. Send the original 2431 to Prosthetics (121).
2. One copy goes in his low vision folder.
3. One copy goes in his permanent folder in the Ward Clerk's office.

GLASSES:

1. Fill out the Prosthetic Request (2431).
2. Make four copies of the prescription, (all on the 10-2914 Form). See the following example for filling out the prescription.
    - A. Send the original Prosthetic Request and two eyeglass prescriptions (include original) to Prosthetics (121).
    - B. Put one prescription in his low vision folder and one prescription in the optometrist's prescription folder.

NOTE: Make sure all copies are readable.

ORDERING AIDS AND EQUIPMENT FOR THE LOW VISION DEPARTMENT

Aids and equipment can be ordered for the low vision department through two different sources. The first is the quarterly budget and the second source is the prosthetics department of the hospital. The prosthetics department will purchase those aids which the low vision department uses and issues frequently. (Examples are a 6x 8x miniscope, pocket magnifiers, etc.) The prosthetics department prefers to buy these aids in quantity, such as a dozen. Whenever possible, it is recommended aids be requested through the prosthetics department, inorder to save budget money for other low vision needs.

QUARTERLY BUDGET :

All sids and equipment ordered on quarterly budget money, should be requested through a VA-2237 Form. To order, you need 5 of the 2237 originals, 4 white tissue carbon copies, and 2 green tissue carbon copies. See the 2237 example, which follows for specifics in filling out this form. All copies go to the secretary with the exception of one green copy. This green copy should be put in the low vision folder labeled "quarterly budget".

PROSTHETICS ORDERING :

To order aids through the prosthetics department, one original 2431 and a white carbon copy should be filled out. Quantities such as one dozen should be requested. See the following 2431 for specifics in filling out this form correctly. The original is sent to the prosthetics department and the one copy is kept for low vision files.

AIDS

NEAR VISION AIDS

Near vision aids are those aids used for doing close work, primarily reading. These aids fall in the following categories:

1. Hand magnifiers
2. Stand magnifiers
3. Headborn magnifiers

On the following pages, are many of the aids used in the low vision department.

In using near vision aids, proper lighting and proper focal distance should be stressed. Statistics should be kept on the student's progress with the recommended optical aids. These statistics are:

Aid Used	Print Size Read	Distance	Reading Speed
6x lense	1M	6 cm.	42 words per minute

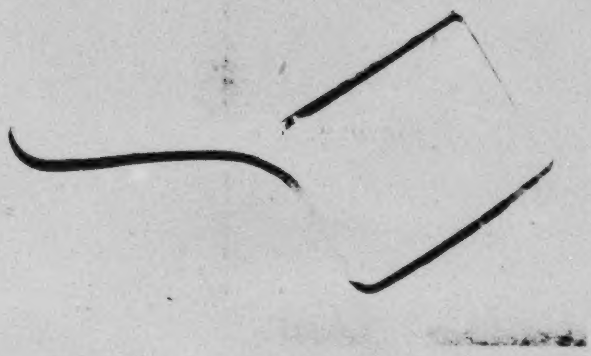
Duration = 10 minutes

In giving a student reading practice, it is suggested the reading task be varied, and also chosen with the individual student in mind. Gear reading practice to the student's level of reading, and also to his interests. If an individual's reading level is questioned, the Gray Oral Reading Exam may be given. This test follows.

Suggestions for reading practice are:

playing cards
envelope addresses
letters
bills
price tags
maps
bus schedules
watches
recipes
forms (tax, credit applications)

HAND MAGNIFIER



Power: These rectangular magnifiers come in a number of powers in the range of 4D, 5D, and 6D.

Recommended acuity: 20/40 20/60

Use: Reading

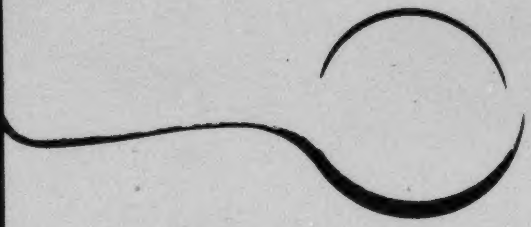
Price: Around $3.00

Note: These magnifiers offer only minimal magnification and therefore have little value to the individual with a very low acuity.

Sources: New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

COIL HANDIMAG



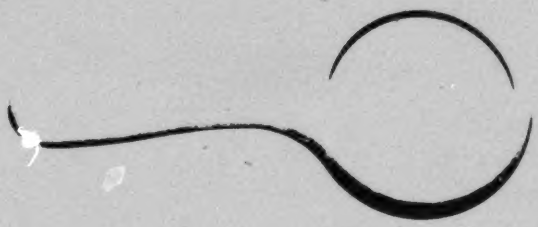
Power: 9D

Acuity: 20/70 20/100

Use: Reading

Price: $1.65

COIL CATARACT HAND READER



Power: 20D

Acuity: 20/100 20/400

Use: Reading

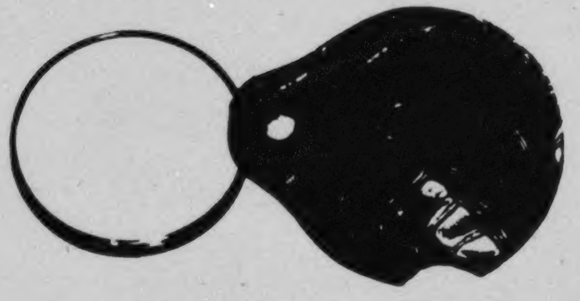
Price: $8.30

SOURCES

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

SELSI POCKET MAGNIFIER



Power: 11D

Acuity: 20/100 20/200

Use: Handy for reading short quick things, such as price tags, not practical for long use.

Price: 70¢

SOURCES:

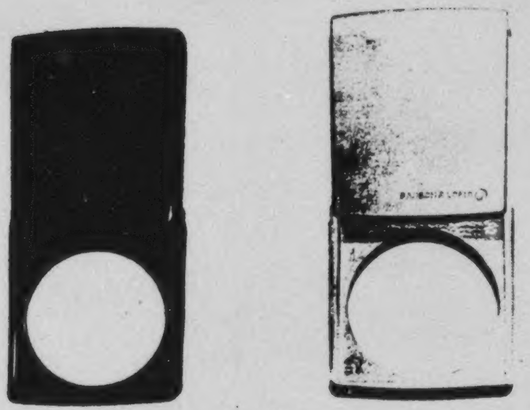
New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

Selsi
40 Veterans Blvd.
Carlstadt, New Jersey 07072

Telephone: (201) 935-0388

BAUSCH AND LOMB PACKETTES



Powers: 3x and 5x

Acuity: 3x = 20/40 - 20/200 5x = 20/100 - 20/400

Use: Short, quick reading

Price: $2.50

Note:

SOURCES:

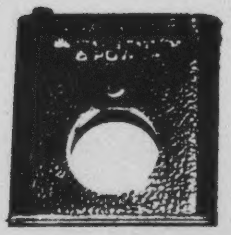
Bausch and Lomb
275 Valencia
San Francisco, California 94103

Telephone: 863-1580

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

SCANNER ILLUMINATED MAGNIFIERS



SCANNER 10X
Illuminating Magnifier

Powers: 5x and 10x

Acuity:

Use: Short, quick reading

Price: $3.25 for 5x, $3.75 for 10x

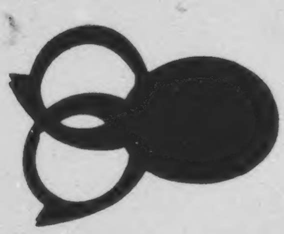
Note:

SOURCE:

Electro-Optix, Inc.
35-12 Crescent Street
Long Island City, New York 11106

Telephone: (212) 786-5300

FOLDING POCKET MAGNIFIERS

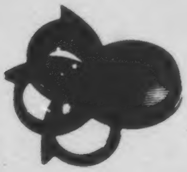


Power: 3x and 4x lenses

Acuity: 20/200 and 20/400

Use: Reading short, quick things

Price: $3.00



Power: 5x, 7x, and 10x

Acuity: Under 20/400 when all lenses are used.

Use: Reading short, quick things

Price: $3.00

SOURCES:

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

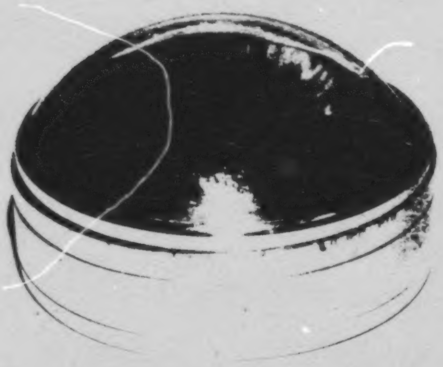
Selsi
40 Veterans Blvd.
Carlstadt, New Jersey 07072

Telephone: (201) 935-0388

Bausch and Lomb
275 Valencia
San Francisco, California 94103

Telephone: 863-1580

SELSI PLANO CONVEX



Power: About 4.7D

Acuity: 20/40 20/60

Use: Reading

Price: $7.75

Note: This is a good stand magnifier for the person who needs a greater working distance. It also has very good light condensing qualities.

SOURCE:

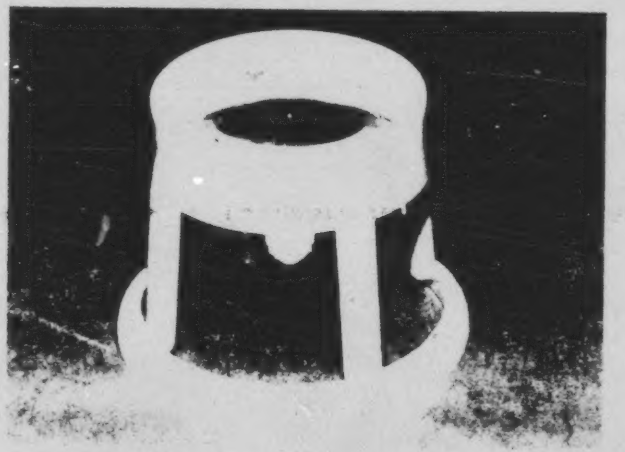
New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

Selsi
40 Veterans Blvd.
Carlstadt, New Jersey 07072

Telephone: (201) 935-0388

COIL HI-POWER READER



Power: 5x or 7x

Acuity: 20/200 - 20/300 (varies with power)

Use: Reading

Price: $6.15

Note:

SOURCE:

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone (212) 355-2200

AGFA LOUPE

AGFA LOUPE 8x

Power: 8x

Acuity: 20/300 or less

Use: Reading

Price: $2.00

Note:

SOURCE:

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212 355-2200

FLASHLIGHT MAGNIFIERS

Powers: 5x, 7x or 10x

Acuity: 20/200 - 20/400 (varies with power)

Use: Reading

Price: $7.00 and up

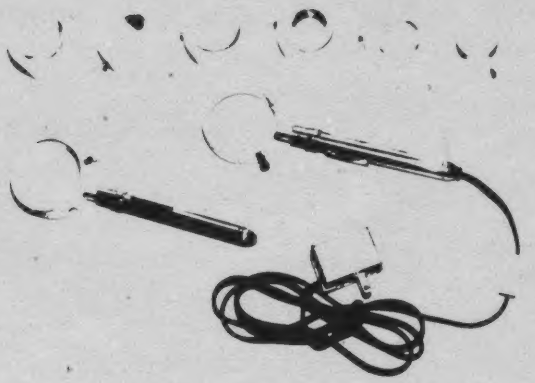
Note:

SOURCE:

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

SLOAN FOCUSABLE STAND MAGNIFIERS



Powers: As above - 18D, 23D, 29D, 37D, 44D, 53D

Acuity : Varies with power - 18D = 20/100 20/200
29D and 37D = 20/200 20/400
44D and 53D = below 20/400

Use: Reading

Price: 18D, 23D, 29D, and 37D are all around $15.50. 44D is $25.50 and 53D is $35.50.

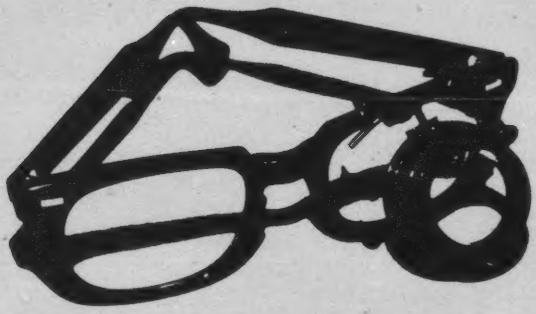
Note: Above lenses come to fit into either the battery or 115 volt illuminators. $5.50 for the battery and $9.50 for the 115 volt illuminator.

SOURCE:

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

ARY LOUPES



Powers: 6.5D; 10D, 11D, 12D, 16D, 20D, 25D, and 32D

Acuity: Varies with power - 6.5D = 20/70 20/100
10D = 20/70 20/200
11D, 12D, and 16D = 20/100 20/200
20D, 25D, and 32D = 20/200 20/400

Use: Reading

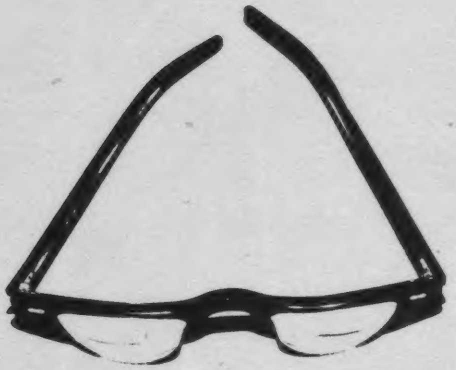
Price: Around $8.50, Set, $47.00

Note: Lenses come individually and fit interchangeably into one ary loupe.

Source: New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone (212) 355-2200

HALF-EYE SPECTACLES FOR BINOCULAR USE



Powers: +6.00, +8.00, +10.00
8 △ 10 △ 12 △

Acuity: +6.00 = 20/50 to 20/70
+8.00 = 20/80 to 20/100
+10.00 = 20/200 to 20/300

Use: Reading binocularly

Price: +6.00 = $25.00, +8.00 = $27.50, +10.00 = $30.00

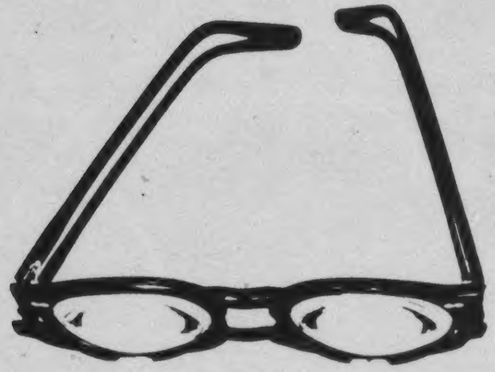
Note:

SOURCE:

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212 355-2200

IGARD HYPEROCULAR SPECTACLES



Powers: 4x, 6x, 8x, 10x

Acuity:

Use: Reading

Prices: 4x, 6x and 8x = $25.00, 10x = $35.00

Note:

SOURCE:

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York, 10022

Telephone: (212) 355-2200

DISTANCE AIDS

Distance aids used in the low vision department consist basically of monoculars and binoculars. A monocular is used with just one eye, and is usually issued to those students having the use of just one eye or who have considerably better acuity in one eye than the other. The main advantage to using a monocular is its small size. Monoculars can easily be carried in a pocket. Binoculars are used with both eyes working together. These are usually issued to students having equal vision in both eyes. Binoculars generally run large in size, which makes it difficult for carrying, although there are a few small miniature models which are good.

The usefulness of monoculars and binoculars comes mainly in orientation and mobility. These aids can help a student read a street sign, store sign, bus number, house address, etc., giving him an orientation to his environment. Many students also find other uses for these aids, such as finding cattle on a cattle ranch. It is a good idea to question the student and see just how he does plan to use a binocular or monocular.

Training with binoculars and monoculars is often necessary. It consists of taking the student out and letting him become accustomed to the aid. One of the more difficult things to do with these aids, (particularly if they are a strong power, eg. 8x) is to locate the object which one wishes to read. The following pointers could be given to a student having difficulty.

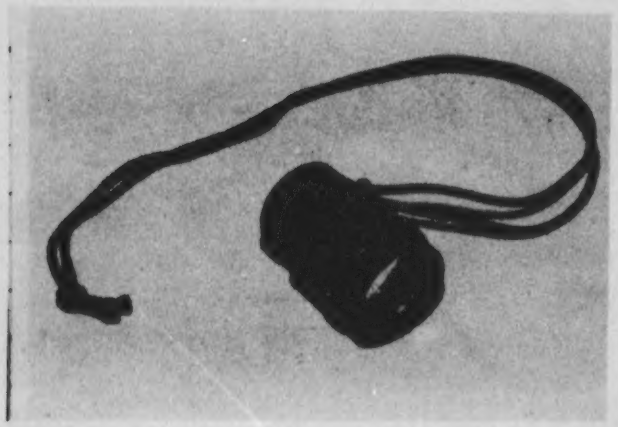
1. Locate the gross object without the aid if possible. Then line yourself directly with that object.
2. Set a pattern for finding things, rather than just searching everywhere for something. A slow scanning procedure should be recommended.
3. For those students who have difficulty steadying the aid, it should be suggested they keep their elbows tight against their body.

Following are some of the monoculars and binoculars used frequently in the low vision department, with descriptions, prices, sources, etc.

NOTE:

Monoculars come in a wide range of powers (magnification). Those with the least magnification are used with students having fairly good acuities. As the magnification increases in an aid, it becomes more functional with those students having poorer acuities.

25x SELSI MONOCULAR



Power: 25x

Acuity: 10/50

Use: Distance viewing

Price: About $4.00

Note: In addition to being used as a distance aid, this is sometimes used inverted (looking through the objective end, backwards) to create a larger field. When this is done, objects will also look 2½ times farther away than they really are. For this reason, this inverted monocular technique should only be used with those students having very good acuities (20/20, 20/30) and very small fields (2° - 3°). The main use for this inverted monocular technique would be to locate objects in a close area. For example, finding something that was dropped, finding something in a room quickly, etc.

SOURCE:

Selsi
40 Veterans Blvd.
Carlstadt, New Jersey 07072

Telephone: (201) 935-0388

2.5x and 3x RING TELESCOPES

Keeler Ring Telescope

Acuity: About 10/50

Use: Distance viewing

Price: $60.00 (1973)

SOURCE:

Keeler Optical Products
5536 Baltimore
Broomall, Pennsylvania

Hellinger Ring Telescope 3.5x

Acuity: 10/50

Use: Distance viewing

Price: $75.00 (1973)

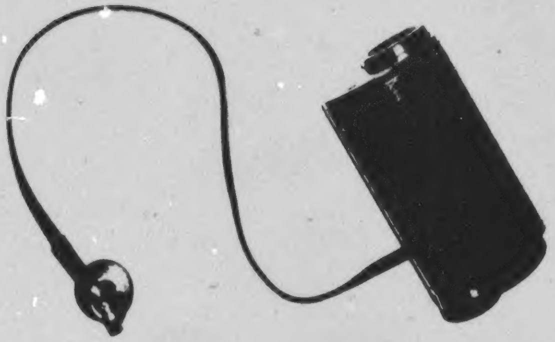
SOURCE:

Dr. Hellinger
20 Park Avenue
New York City, New York

Telephone: (212) 685-7743

NOTE: These telescopes are miniature size, and can be fit on a ring (finger) mounting. This feature makes the telescope quite convenient, and also prevents being conspicuous with a large monocular.

4x HUNTSCOPE



Power: 4x

Acuity:

Use: Distance viewing

Price: $30.50

NOTE: There is no focus on this aid, which is sometimes an asset with the student who has difficulty understanding the use of monoculars. It does have fine "range finder reticles", or criss-cross lines in the viewer.

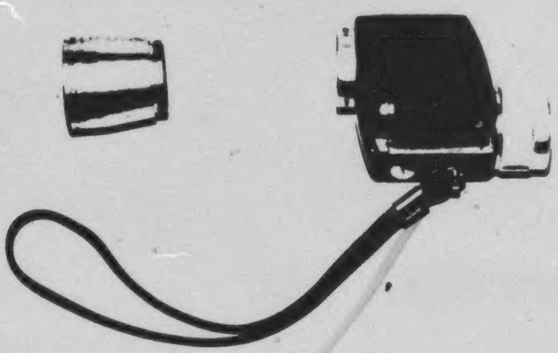
SOURCE:

Swift Instruments
4th Street
San Jose, California

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

6x, 8x MINISCOPE



Powers: Both 6x and 8x

Acuity:

Use: Distance viewing

Price: About $19.50

NOTE: There are two objective lenses which are interchangeable.

SOURCES:

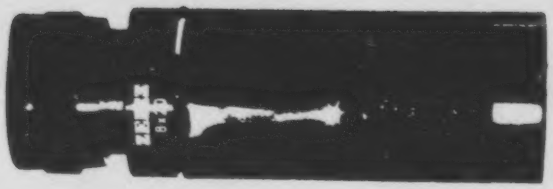
Selsi
40 Veterans Blvd.
Carlstadt, New Jersey 07072

Telephone: (201) 935-0388

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

ZEISS 8x 20 MONOCULAR



Power: 8x

Acuity:

Use: Distance reading

Price: $69.00 (plus $1.00 for shipping, June, 1974)

NOTE: This monocular is quite compact and will fit in a shirt pocket, using the pocket clip. It has a minimum focal distance of about 6 feet.

SOURCE:

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone; (212) 355-2200

BIG 6x, 8x, 10x, 12x, 16x, and 20x MONOCULAR

Powers: 6x, 8x, 10x, 12x, 16x, 20x

Acuity: Varies with power

Use: Distance viewing

Price: Varies from $18.50 to $36.50

NOTE: Sometimes a student who has difficulty using the smaller 6x 8x miniscope is able to use this monocular, simply because it is larger and easier to hold. (Magnification and field is approximately the same as the miniscope, in smaller powers.)

SOURCES:

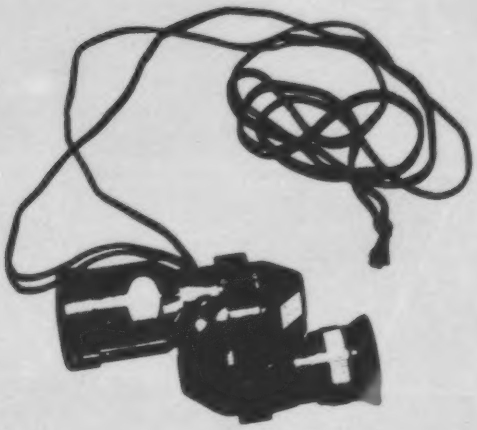
New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

Selsi
40 Veterans Blvd.
Carlstadt, New Jersey 07072

Telephone (201) 935-0388

10x MONOCULAR



Power: 10x

Acuity: Poor

Use: Distance viewing

Price: $16.00

NOTE: This is often a difficult aid to use since it has an extremely small field. Extensive training is recommended with this aid.

SOURCE:

Selsi
40 Veterans Blvd.
Carlstadt, New Jersey 07072

Telephone: (201) 935-0388

MINIATURE BINOCULARS

The following binoculars are miniature type. They are quite compact and easy to handle. Magnifications offered are: 2.5x, 4x, 6x, 7x, 8x, and 10x. These binoculars are issued to those students having good binocular vision. (Are able to use both eyes together and have fairly equal acuities in each eye.)

SOURCES:

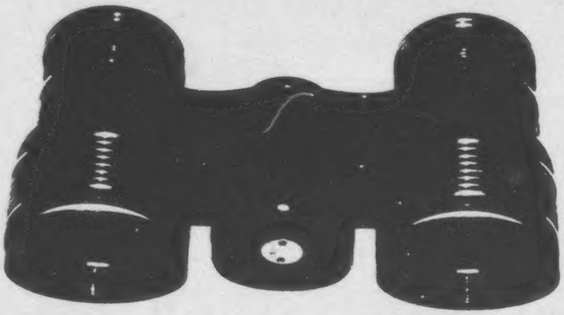
Swift Instruments
4th Street
San Jose, California

Telephone: 293-2380

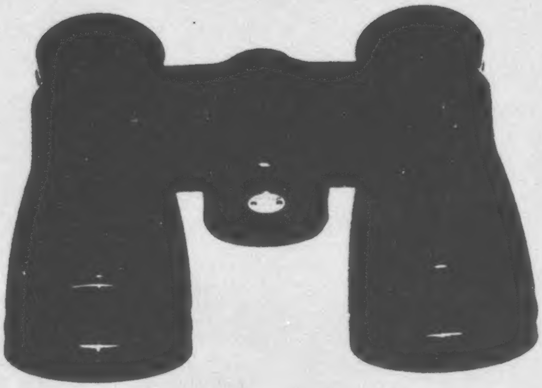
Selsi
40 Veterans Blvd.
Carlstadt, New Jersey 07072

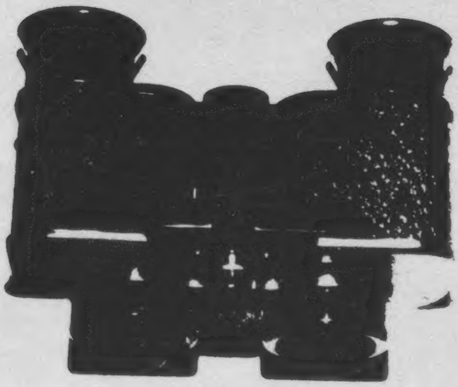
Telephone: (201) 935-0388

2.5x Binocular



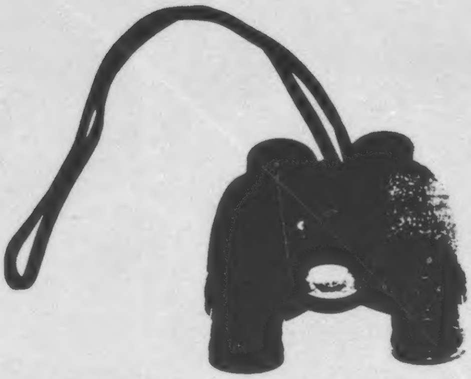
4x Binocular





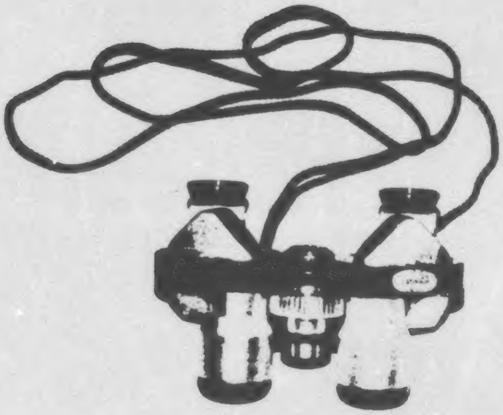
6x 15mm Binocular

(Swift)



7x 25mm Binocular

(Swift)



7x 18mm Binocular

(Selsi)

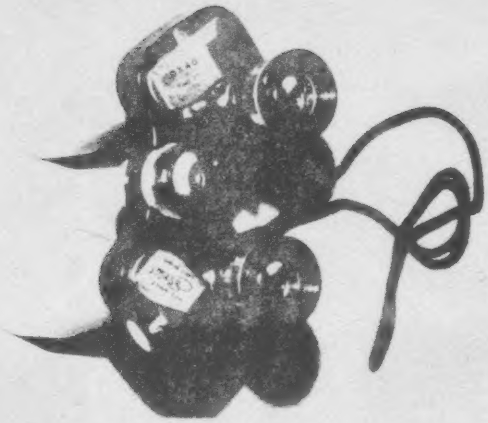
8x 20mm Binocular

(Selsi)

10x 20mm Binocular

10x 40mm Binocular

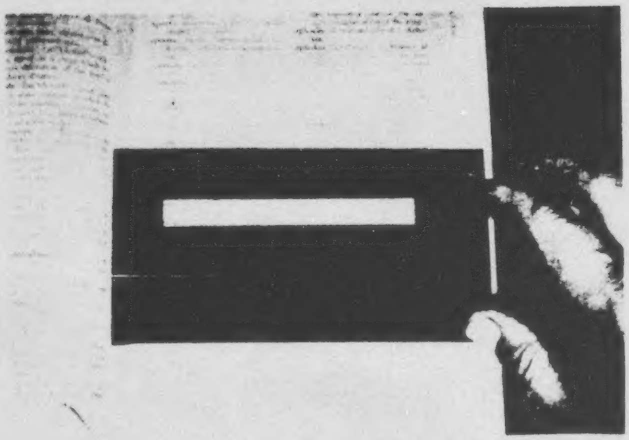
(Selsi)



MISCELLANEOUS DEVICES

The items described in this section are helpful devices of non-optical nature for visually impaired persons.

TYPOSCOPE

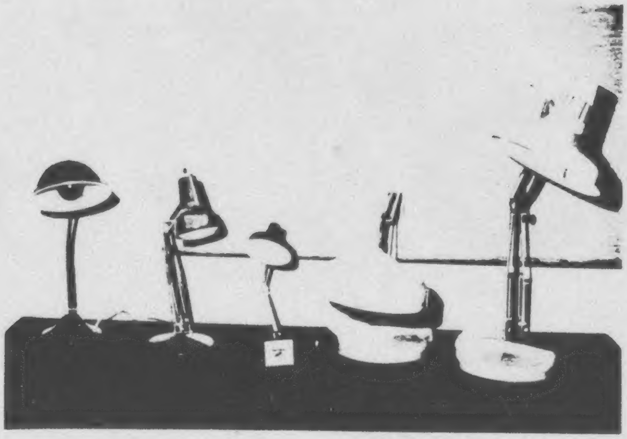


These are used to prevent glare (from a white page) while reading, and also to help keep one's place on the correct line.

Price: $.50 each

SOURCE: Designs for Vision
40 East 21st
New York City, New York 10010

LAMPS



Good lighting is essential to the low vision student. There are many good lamps available, from various sources, in different price ranges.

Price: Varies

SOURCES: Primarily local

Luxo
P. O. Box 947
Sausalito, California 94965

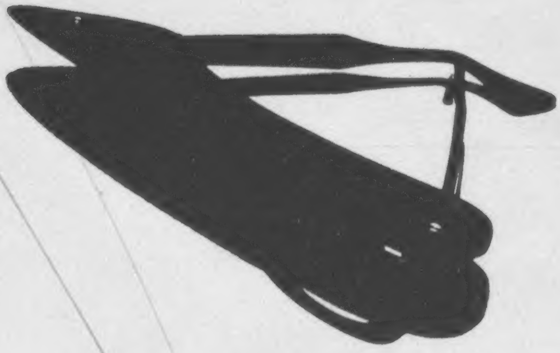
SLIP-IN SUNGLASSES

These are plastic sunglasses with a side shield curve, that slip easily inside a pair of prescription glasses when needed.

Price: $ .50 each

SOURCE: Yorktown Optical Company
469 West Market Street
York, Pennsylvania 17404

VISORS



Use: These fit over glasses frames, and help to prevent glare from the sun, overhanging lights, etc.

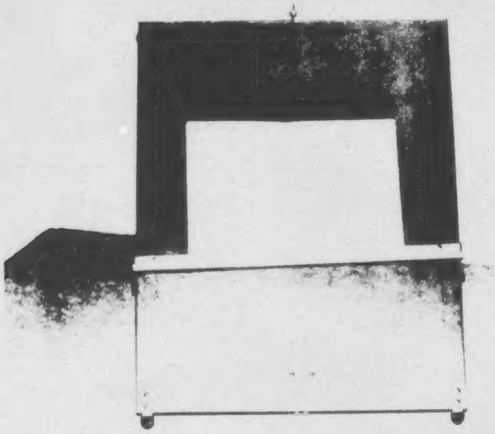
Price: 50¢

SOURCE

New York Lighthouse for the Blind
111 East 59th Street
New York City, New York 10022

Telephone: (212) 355-2200

ADJUSTABLE READING STANDS



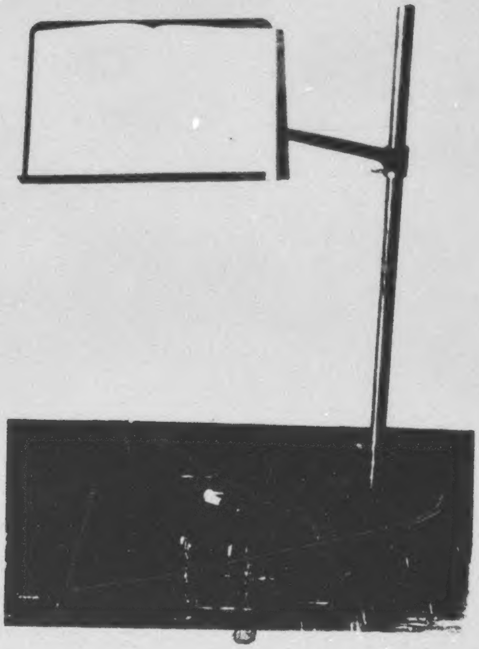
Use: These can be used to hold reading material, in order that a student does not have to bend over reading material for any lengthy period of time.

Price:

SOURCE:

Test Rite Instruments
135 Monroe Street
Newark, New Jersey 07105

SHAFER READING STAND



Use: These are used to hold reading material. It is a very sturdy stand, and quite flexable in movement. It is especially good for use with a typewriter.

Price: $50.00

SOURCE:

American Printing House for the Blind
1839 Frankfort Avenue
Louisville, Kentucky 40206

BOLD-RULED PAPER FOR WRITING

Use: This paper will sometimes enable a low vision student to write again, with the use of a felt tip pen.

Price: 70¢/pound

SOURCE:

American Printing House for the Blind
1839 Frankfort Avenue
Louisville, Kentucky 40206

FELT TIP PENS

Use: These will sometimes enable a student to read his handwriting

Price: $.49 to $2.00

SOURCE:

Any drugstore, variety store, etc.

CLOSED CIRCUIT TELEVISION

CLOSED CIRCUIT TELEVISION
EVALUATION AND TRAINING

I. ORIENTATION TO CCTV

A. Explain that the machine consists of: (PARTS)

1. television camera and zoom lens
2. television set or monitor
3. camera stand
4. lighting system
5. common switch (all electrical components)
6. base and mounting bracket for monitor (depending on size)
7. coaxial cable connecting camera and monitor
8. X-Y table with brake

B. Demonstrate the operation of controls and adjustments

1. on-off switch for camera
2. on-off switch for monitor
3. outlets on back of camera stand and behind light on post
4. operation of common switch
5. aperature (light), zoom (magnification), and focus adjustments on lens (Aperature should be about three clicks back on Visualtek and always focus at maximum magnification.)
6. Brightness and contrast controls on the monitor
7. Horizontal and vertical controls on the monitor
8. Polarity switch on camera
9. adjustment for positioning camera height above reading material
10. Positioning of reading material on X-Y table for most effective use.
    - a. Place material on table so that when table is farthest from the mounting post the top line of the material to be read is in the proper place on the screen of the monitor.

b. Place the material on the table so that when the table is at the extreme right position the left edge of the reading material is in the right place on the screen of the monitor.

II. EVALUATION

A. Determine print size, magnification, distance figures

1. Find the smallest print (in sloan M units) which can be read at minimum magnification and distance from monitor in centimeters. Record this information. (Find the minimun magnification and distance that 1M can be read at.)

B. Determine reading speed

1. Using appropriate level reading material, test for reading speed.
2. Record all figures pertaining to magnification, print size, and distance from monitor for each task performed with TV.
3. Be sure that the student experiments with the amount of magnification in relation to his distance from the monitor for the various print sizes to determine the optimum magnification - distance relationship for his particular visual level.

III. TRAINING

A. Instruct the student in the use of the CCTV for the following reading materials:

1. typed letters
2. handwritten letters
3. textbook or similar material
    a. determine length of time student can use the CCTV before noticing fatigue or eye strain
4. magazine
5. dictionary
6. newspaper
7. telephone book (white pages and yellow pages)

8. any other material that the student might have a use for.

B. Instruct the student in the use of the CCTV for the following writing tasks:

1. marking pen on heavy lined paper
2. ballpoint on heavy lined paper
3. ballpoint on regular lined paper
4. pencil on regular lined paper
5. pen or pencil on unlined paper

C. Have student write a letter and address on an envelope.

D. Have the student write a check and complete the check stub.

E. Have student fill out a sample application form.

1. bank loan
2. department store credit
3. work application
4. credit card application

F. Give student optional projects if time permits such as:

1. read a map
2. crossword puzzle
3. read charts, tables or graphs

G. After student has completed all of training, retest for reading speed to determine if improvement has been made and if so how much.

NOTE: Effective magnification:

Example: 8x at 20 centimeters (40 centimeters is standard)

$$\begin{array}{r} 40\text{cm} \\ \underline{8x} \\ 320 \end{array} \qquad 20\,\overline{)\,320}^{\;16x} \text{ effective magnification}$$

IV. TYPING WITH CCTV

V. ASSEMBLY OF TELEVISION

C.C.T.V.

Introduction and orientation to C.C.T.V. ________________________________

Read reprint on C.C.T.V. ________

Introduction in:

use of dictionary____

use of phone book____

handwriting instruction: regular and felt tip pen________
regular and heavy lined paper______

check writing__________

form filling out________

typing________________

assembly and disassembly of C.C.T.V.______________

Use of the following models of C.C.T.V.:

Visualtek, standard__________

Visualtek, Miniviewer________

Appollo II________________

Appollo IV________________

Pelco____________________

DATE	MODEL	TASK	POLARITY	MAG.	PRINT	SPEED	DISTANCE	ADD	TIME

NAME	BEST OPTICAL AID	READING SPEED	DURATION

CRITERIA AND GUIDELINE FOR ISSUING THE C.C.T.V.

The following criteria were established by a workshop of VA low vision personnel for the Blind Rehabilitation Centers as Hines, Illinois; West Haven, Connecticut; and Palo Alto, California, February 10, 1972. It is recommended that the V.A. loan a C.C.T.V. to an eligible veteran applicant if all of these criteria are achieved after:

(a) It has been established that there is a need to manage the written word regularly, or perform other specific visual tasks. The need will be confirmed by the evaluations of the staff low vision specialist, optometrist and psychologist.

(b) A low vision optometric examination, which may be completed prior to entrance into the C.C.T.V. program.

(c) Guided practice with optical and other low vision aids.

(d) At least 15 hours of training and evaluation with the C.C.T.V.

The criteria are:

1. The veteran should be able to read print of 1M size or smaller with the C.C.T.V., using Sloan M units.
2. The veteran should attain a reading speed of 30 words per minute or if he exceeds 30 wpm, read 50% faster with the C.C.T.V. than he can with the best near correction or other low vision aids. He should read with adequate comprehension, as determined by the low vision specialist.
3. The veteran should be able to read for 30 consecutive minutes with the C.C.T.V. If he can exceed this, he should be able to read 100% longer with the C.C.T.V. than he can with the best near correction, or other low vision aids.

4. The veteran should be able to address an envelope and write a letter. His writing should be legible.

5. The veteran should be able to operate the device independantly for both reading and writing involving:

   (a) Change of focus

   (b) Change of magnification

   (c) Change of polarity

C.C.T.V. REVISED FOLLOW-UP

1. Name: ____________________ 2. Date: ____________________

3. Follow-up Number (1st, 2nd, 3rd): ____________________

4. BRC Attended: (PAVH, Hines): ____________________

(If Palo Alto, check if participated in VR ________)

5. Date C.C.T.V. Recieved: ____________________
(Month, Day, Year)

6. Student's subjective opinion of eye condition now as compared to when he was at BRC (or last follow-up): ____________________
(Same, Better, Worse)

7. Visual Aids obtained from sources other than BRC (include only those aids the student uses and list source of aid, type of aid, and approximate cost as well as the student's opinion of its usefulness).

____

____

____

8. Education level (number of grades completed): ____________________

9. Date of Birth: ____________________

10. Amount of time spent reading per day before legal blindness.

____

11. Amount of time spent reading per day after legal blindness, but before entering BRC: ____________________

12. Average number of hours spent reading now per day, with all aids.

____

13. Average number of hours spent reading per day with C.C.T.V.

____

14. Occupation prior to legal blindness: ____________________

____

15. Current occupation: ____________________

16. Recent major medical problems: ____________________

____

17. What material does he read: ____________________

18. Visual Acuity:

	Distance			Near		
Unaided	O.D.____	O.S.____	O.U.____	O.D.____	O.S.____	O.U.____
Aided	O.D.____	O.S.____	O.U.____	O.D.____	O.S.____	O.U.____

19. Utilization of Aids:

Distance Aids	Near Aids
A. Rank Order of Usefulness	A. Rank Order of Usefulness
#1 (MOST) ____________	#1 (MOST) ____________
#2 ____________	#2 ____________
#3 ____________	#3 ____________
#4 ____________	#4 ____________
B. Amount Utilized:	B. Amount Utilized:
a. Frequency Used (days/week):	a. Frequency Used (days/week):
#1 ____________	#1 ____________
#2 ____________	#2 ____________
#3 ____________	#3 ____________
#4 ____________	#4 ____________

20. Where is C.C.T.V. located and is it easily accessible. ____________________

____

21. Reading speed with C.C.T.V. ____________________

22. Parameters: Work Distance: ____________________

Image Height : ____________________

Magnification: ____________________

Estimated Duration: (in minutes): ____________________

Comprehension: ____________________

23. Reading Speed with Optical Aid: ____________________
(Only if used)

24. Parameters: Optical Aid: ____________________

Magnification: ____________________

Working Distance: ____________________

Estimated Duration: (in minutes) ____________________

Comprehension: ____________________

25. Why does he stop reading with C.C.T.V.: ____________________

____

26. Why does he stop reading with Optical Aid: ____________________

27. Interval between having to stop and before he can use C.C.T.V. again: ________

____

28. Uses of C.C.T.V.: 1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________

29. Student's Opinion of C.C.T.V.: Rating: 1. (very good)
2. __________
3. __________
4. __________
5. (very poor)

30. Family Opinion of C.C.T.V.: Rating: 1. (very good)
2. __________
3. __________
4. __________
5. (very poor)

31. Can Student operate C.C.T.V. effectively: ______________________________

32. Mechanical/electrical repair problems with C.C.T.V.: ______________________

____

33. Comments: ____

____

____

CLOSED CIRCUIT TELEVISION ISSUANCE

C.C.T.V.s issued from center:

1. Get serial numbers from camera, camera system, lens and TV.
2. Pack C.C.T.V. unit
3. Type letter to supply requesting shipping of C.C.T.V.
4. Send letter to student's regional office, notifying of issuance and listing on repair list.
5. Send warranty card and V.A. INFORMATION FORM.
6. Put card in C.C.T.V. follow-up file box.
7. List student in C.C.T.V. folder.

C.C.T.V.s (issued through regional offices)

1. Put on student's prosthetic list
2. Put card in file box, (C.C.T.V. follow-up)

REPORTS

Standard Form 507
(Revised August 1954)
Bureau of the Budget
Circular A-32

U.S. GOVERNMENT PRINTING OFFICE 1961 O—587479

CLINICAL RECORD

Report on Low Vision Final
or
Continuation of S. F.
(Strike out one line) (Specify type of examination or data)

(Sign and date)

entered low vision on and had a total of hours in the area (low vision, Dr. Mehr, CCTV).

The diagnosis of his eye condition is:

Low vision testing was completed with this student, and he was evaluated by Dr. Mehr, for all beneficial aids. The following aids were recommended:

Complete instruction in the use of all visual aids was given. Mr. was able to read wpm for a duration of minutes with his best optical aid ( ). With the CCTV he was reading wpm for a duration of hours.

CCTV Read-Write System

SOURCE:

Low vision specialist

(Continue on reverse side)

PATIENT'S IDENTIFICATION *(For typed or written entries give: Name—last, first, middle; grade; date; hospital or medical facility)*

REGISTER NO.	WARD NO.

VAPA, Western Blind Rehabilitation Center
3801 Miranda
Palo Alto, California 94304 (126b)

REPORT ON or CONTINUATION OF
Standard Form 507
507-104

70a

PERCEPTUAL TRAINING

LOW VISION PROGRAM FOR NEAR-VISION TASKS

I. INTRODUCTION

II. EVALUATION OF EACH STUDENT'S VISUAL PROBLEMS AND NEEDS

  A. History

  B. Acuity testing

  C. Field testing

  D. Other perceptual losses and distortions

    1. Color discrimination

    2. Form discrimination

    3. Figure-ground discrimination

III. LOW VISION AIDS AND MAGNIFIERS

  A. Types of aids

  B. Importance of lighting and other factors

  C. Training using the aids

IV. IMPROVEMENT OF VISUAL PERCEPTION THROUGH TRAINING

  A. Formulation of training plan for the individual student

  B. Lesson plans

V. SUGGESTED READINGS

INTRODUCTION

A person with low residual vision is often at a loss as to how to cope with his envisonment. He can neither identify with the totally blind nor the totally sighted population and is uncertain of his role in society. Nor does society provide much assistance for this individual. There is a definite lack of community resources for the rehabilitation of the partially sighted person. Low vision clinics are beginning to spring up across the nation, but they are few and far between. Optometrists and ophthalmologists do the best they can under the circumstances. Many of them are helpful in prescribing an optical aid to improve the individual's visual acuity. However, they often do not have the time to train the person in the use of the prescribed aid. Very few eye specialists have the time or knowledge to help the patient improve his visual perception as well as his acuity. Therefore, in many cases, although acuity is improved with the aid, visual functioning is not. Because of this lack of training in the use of their residual vision, many low vision persons encounter needless frustration and loss of functioning.

It has been shown that a person will try to use his remaining vision, no matter how inefficient his method of doing so may be. Here at the Center, we felt a need to develop a section of our program which would assist the low vision person by training him how to use his residual vision in the most effective manner. The particular area of the program that will be outlined here is designed to improve visual efficiency in near-vision tasks (generally tasks that are performed at a distance of 14 to 16 inches from the eyes, such as reading). It was felt that classroom situation would be the ideal place for such training to take place.

100

Here we can control the environment and the amount of variables to a certain extent. The low vision person can concentrate more fully on the near vision task hand in this way. Hopefully, the perceptual improvement gained in this type of controlled situation will transfer into the individual's daily life from near vision to distant vision tasks, particularly in the area of mobility.

Our program was designed with two purposes in mind:

1. To determine the student's present amount of residual vision and his level of visual functioning.
2. To train him to use his remaining vision in the most effective manner--either through the use of low vision aids or perception training or a combination of both.

Clearly, then, there are two distinct sections in the program--evaluation and training.

This outline of the program is not meant to be followed rigidly, but only to be used as a guide. Since there is a great difference in individuals (even those with similar eye conditions) any program would have to be tailored to meet individual needs. Techniques and materials described should be used selectively with individuals.

EVALUATION

HISTORY

Evaluation of the student's present visual functioning starts at the most logical point--with the student himself. His first contact with the low vision specialist is in the form of an informal interview. The purpose of the interview is to familiarize the student with the program; it is also important at this time to get an idea of the student's view of his visual loss.

Taking an accurate history of the student's condition is one of the essential first steps in the evaluation process. It is sometimes difficult for the student to describe how he sees, so it may help to ask him about specific tasks that he can or cannot perform. One note of caution is necessary here: Never put the student on the defensive about his condition. Try to make him as comfortable as possible. If you notice that certain questions upset him, avoid that type for the present. In many cases, the best technique is to let the student talk; you can usually direct the conversation without asking needlessly pointed questions. Remember that the student is likely to feel that his lack of vision makes him "abnormal" and he already spends a great deal of his time justifying his actions to the public and himself.

In addition to the medical data found in the official records, a good history should include the following items:

1. What near vision tasks the student now performs --

   Can he read the newspaper articles or headlines? Does he read personal handwritten letters? Watch TV? Can he identify objects in snapshots or magazine pictures?

2. What are his expectations and goals --

   Some people have unrealistic goals about what aids can and cannot do. They may think that an aid will restore vision completely and allow them to function as well as the totally sighted. On the other hand, a person may see his loss of sight as absolute and complete and not even try to use his residual vision.

3. What has he been told about his condition --
   Many believe that their eyesight will decline if they use it. This fear is not always disspelled by the doctors, although it should be. Recent research reveals that there is no foundation for this belief.

4. What aids (if any) he now uses or has used in the past --
   Some people have met with failure in the use of aids and are now convinced that no aid can ever help them. Others have used aids previously which no longer work well for them. At any rate, re-evaluation of the aids is the recommended procedure.

5. What the student himself sees as areas of particular difficulty --
   There may be one or more area in which a student feels especially uncomfortable. He may be reluctant to discuss it because he feels it is too petty or insignificant. One common problem is being able to judge the distance of objects accurately so that one can reach for a glass of liquid without knocking it over, etc.

From the information gathered in this interview, the low vision specialist should get some idea of the student's motivation to use his residual vision and, if little exists, how she can motivate him further. For example, if he is interested in sports, use printed materials dealing with that subject. He may surprise you and gradually work his way down to reading the sports page of the local newspaper - with suitable aids and training.

If his lack of motivation is due to numerous failures, bolster his confidence by starting out with large items that he can easily see and progress to smaller items. In this manner, a series of success experiments are built up and the student is encouraged to try more difficult tasks.

Other persons may lack motivation because the tasks they are asked to perform are too easy and lack challenge. For some, they may seem to lack purpose. Therefore, it is improtant to explain, from time to time, the reason for doing particular exercises. It is also necessary to continuously re-evaluate the individual's program.

ACUITY

The next step in the evaluation process is measuring the student's visual acuity. This is done for both distance and near vision. For distance acuity, several charts are used. They are: Snellen "E" chart, Landolt Ring chart, and the Feinbloom number chart. Different test charts often yield different test results, even though they are all based on the same principle of visual angle.

The test procedure should remain constant for each of the test charts. The student is asked to stand 20 feet from the chart and begin reading from the top. If he is unable to see any of the test objects at this distance, move him up to ten feet from the chart. There will be some students who still are unable to see at this distance. In these cases, gradually decrease the distance as necessary until he is able to read at least one line of the chart. Each eye should be tested separately, and then both together.

Results of distance acuity tests are reported in ratios such as 20/200. This means that the student can see at 20 feet what a normally-sighted person can see at 200 feet. Obviously, this is a notation used chiefly for uniformity of measurement. When results are extremely low, such as 3/400, one cannot say that the person tested actually sees at 3 feet what another sees at 400 feet. In addition, there is doubt as to whether 3 feet can truly be considered "distance vision". However, in the absence of a better system, these ratios must be used. It is good, though, to be aware of their deficiency.

As stated before, test results will vary with the test chart used. All of the reasons for this are not clear. Each of the test charts used here are similar in the fact that they are all cardboard rather than projected charts. They are also all based on the Snellen principle of visual angle. However, each has its own distinctive quality.

The Snellen "E" chart, probably the most widely used test chart, is designed to test normal or near-normal vision. For this reason, there are small gradients of variation around the normal distant vision area of 20/20. The largest test objects, however, have no such gradients. For example, the largest object is measured at 20/200; the next object in the sequence is 20/100-- a jump of 100 feet. For a person whose visual acuity lies between these two steps the results may misrepresent his actual acuity. Since he cannot read the 20/100 line, his vision will be reported to be 20/200. In actuality, it may be 20/150 or 20/175. The test results can only be as refined as the instrument which measures them.

The Landolt Ring chart uses broken circles as test objects. The subject is asked to report where he sees the breaks in the form. There are several advantages to this chart. First, there are test objects at intervals between 20/200 and 20/100 so that vision in that area can be more adequately measured. Second, since all the test objects are similar in shape there is less chance of the subject guessing the correct answer. Third, I have noticed that several subjects who have distorted images are unable to report whether the break is directly on top or slightly toward the left or the right. Many times they are unaware of this distortion and cannot understand why they sometimes experience difficulties in judgement. Once this problem is revealed, some means to cope with it can be established.

The Feinbloom Test Chart for the Partially Blind is in many ways the best one for our purposes since it was developed especially for low vision clients. The test objects are much larger than those found on the ordinary eye charts, and there are many more gradients so that the acuity measured is more accurately defined. This test also used numbers instead of letters as test objects; this means that it may easily be used with non-readers.

For testing near vision acuity, the reduced Snellen letter chart found in the back of Stimson's book, Optical Aids for Low Acuity, is used. Specific instructions for its use are outlined in the book. This book also includes a guide regarding the amount of magnification needed to read various sizes of print. Various other charts including the Sloan Reading Cards can also be used to determine the smallest size print the student can read.

FIELD TESTING

Defects in the field of vision are responsible for much of the loss of functioning experienced by a person with low residual vision. To evaluate the student's visual problems, we need some measurement of his visual field. In our program we use the tangent screen and the perimeter to obtain these measurements. Before describing these instruments and the procedure for determining the field of vision, we should talk a little about fields in general and what is considered to be a normal field of vision.

According to most experts, a normal field of vision is described as 60° upward, 75° downward, 60° nasally, and 95° temporally in each eye. This means that when a person is fixating on an object directly ahead, he is aware of any other object that comes within the above described range. Within this field there is only one spot that is blind and this is between 15° and 20° temporally in each eye. This is a normal phenomenon which exists in all people although they are not conscious of it. There is some slight variation in the dimensions of individual fields of vision which are considered to be normal; this is due to the structure of the nose and other facial features.

There are two distinct types of vision: central and peripheral. The central vision, usually considered to be the area within 25° of the point of fixation, is the region of greatest acuity or sharpness of vision. This is the area of vision which is used to pick up the fine details of objects. It is especially important for the efficient performance of near-vision tasks and reading activities. Without central vision, objects appear very blurry and have a tendency to lose their shape.

Peripheral vision is used chiefly to detect movement and the presence of large objects in the visual environment. It is extremely important for mobility purposes. Although things seen peripherally are not clearly defined, the viewer is aware of their presence and their approximate distance from him. If he desires to see them more distinctly, he merely directs the central portion of his vision toward them by turning his head.

Defects in the field of vision are a result of the progression of eye diseases and injury to the eye and/or the brain. Getting an accurate picture of the type of vision loss a person experiences is necessary to realistically evaluate his visual functioning and potential for training. For example, if a person has only a narrow field of central vision (generally called tunnel vision), he may be able to read all sizes print with or without aids, but he could experience considerable difficulty locating his chair or walking about in a crowded room. A person with only peripheral vision might have no problem walking around, but may be unable to read or distinguish one color from another. If the instructor is unaware of the effects of various types of field loss, he may have a tendency to disbelieve the student's lack of performance and conclude that the student is "faking" to satisfy some unmet emotional needs. Although this does happen occasionally, it is not usually the case. It is best to give the student the benefit of the doubt in such matters.

One method of field testing is the use of the tangent screen. This screen is used to plot field defects in the central 30° to 35° of vision. It is a large black screen, usually marked off in circles with a radius of 10°, 20°, and 30°, from the central point of fixation. The student is placed in a chair one meter (39") from the screen. He is asked to cover one eye and fixate directly on the dot in the center of the screen. The instructor then selects a target that can be easily seen by the student and attaches it to a black wand. After instructing the student to look directly at the center dot at all times, she moves the target around the screen following the prescribed method. The student is asked to report when he no longer sees the moving target. By repeating this process throughout the entire field, a diagram can be plotted. A separate drawing is plotted for each eye. Results of the testing can be plotted on graphs such as the one on the following page.

It is usually best to begin by checking out the normal blind spot. This can be used as a guide to determine whether or not the subject is fixating properly on the center dot. There are many different methods of doing fields in the tangent screen, i.e., inward-outward or opposite meridian techniques. For specific details of how to proceed with the various types of cases, it is suggested that you consult Dr. Harrington's book, Visual Fields, which is in our library. It is also advisable to repeat the entire test under different conditions, such as using different size targets, varying the distance from the screen to two meters, testing with and without the subject's glasses, and varying the lighting conditions.

The perimeter is another instrument for measuring the dimensions of the visual field. It is different from the tangent screen in that it is used to determine the amount of **peripheral** vision the subject has. One eye is tested at a time. The subject is asked to place his chin in the chin rest and fixate on the large yellow target in the center of the perimeter. The instructor moves a smaller target and asks the subject to report when it disappears. After the field has been tested on the 0 to 180 axis, the machine is rotated to other positions. In this way, the entire field can be tested. The procedure is repeated for the other eye.

Results of the test should be recorded on the graph at the lower half of the page on which the tangent screen results are recorded. The diagrams may look very different because the latter one includes the peripheral field. However, the central portion of vision should be similar in both tests; if it is not, the tests should be repeated to ascertain their validity. Some daily fluctuations in vision are possible, but they are generally not radical changes.

After we have plotted the student's field of vision, we have some idea of the types of problems he is likely to encounter. We will now proceed to administer specific tasks to verify the presence of these problem areas and then begin to formulate a plan of training to help alleviate as many of these difficulties as possible.

OTHER PERCEPTUAL LOSSES AND DISTORTIONS

1. Color Discrimination

Being able to distinguish the basic colors is important in daily living tasks and evaluation of this type should not be overlooked. In addition to its practical value, what colors the person sees often tells us something about his field of vision and the condition of his retina. For example, if a person can recognize green, this means he has some undamaged cones in the central 15° of the retina; red, in the central 20° ; and blue, in the central 30° of the retina. Thus, a person with large central scotomas may see blue, but red and green look grey or even black to him.

To determine color discriminatory abilities, use cards of six basic colors---violet, blue, red, orange, green, and yellow. (Either the form puzzle or the geometric shape cards may be used for this purpose.) Present these to the student one at a time and ask him to identify the color of each. If he has difficulty with them, you may want to allow him to use all the cards together; by comparing and contrasting the colors, many persons can correctly identify them. However, if the person needs to do this to distinguish the colors, part of his training should include work with colors. Lessons 2 and 3 might be considered for his program.

2. Figure-Ground Discrimination

Frostig's Developmental Test of Visual Perception Parts II and III are used to determine whether or not a student experiences difficulties in picking out a figure from a background. By observing the student closely and asking him questions about his performance, it is fairly easy to detect other possible areas of difficulty such as double images and form distortions and sometimes even spatial and depth perception problems.

3. Form Discrimination

Many people with low residual vision are unable to distinguish the form of objects. This may be due to poor acuity or field loss or both. It is important to determine the extent to which the individual student can recognize form so that he can receive the proper training. With the correct type of training all students can improve their ability to discriminate form and shape.

Use the geometric shape cards for evaluation purposes. Select all six shapes of the same color. Present them one at a time to the student and ask him to identify each form. If he has difficulty with this task, be sure to include some form discrimination activities when writing his plan for perceptual training. Lessons 1, 3, 4, 5 and 10 should be considered for this purpose.

USE OF LOW VISION AIDS

After evaluating the student's present visual functioning, we are ready to determine what type of aid, if any, he will be able to use effectively. Although not all persons can use optical aids, it has been estimated that about 85% of low vision persons can benefit from them if given the proper training.

Since this manual deals chiefly with training principles, none of the aids will be covered in detail. Volumes have been written about specific aids and their uses; it is suggested that you consult them for detailed information. Generally speaking, however, optical aids are employed to improve the individual's visual acuity or the sharpness with which he sees objects. This necessarily involves central vision. It follows that persons with only peripheral vision are not likely to benefit from the use of aids. Magnifying aids are used for near vision tasks; telescopes are used for viewing distant objects. No optical aid improves the field of vision. A list of the various types of aids used is found at the end of this section.

There is no one aid that is best for all low vision persons. The selection of the right aid will depend on the individual's visual acuity, his interests, motivation, and the type of activity he wishes to accomplish with the aid. The amount of magnification needed is determined roughly by the acuity. Several arithmetic formulas for computing this figure can be used. One of the simplest is the Kestenbaum rule. The numerator of the student's distance visual acuity is divided into the denominator; the result should approximately equal the magnification required to read the

Jaeger 5 on the near vision reading chart. This resulting number is in diopters; if you want to know the magnification you would divide by four. For example, a student with a distance acuity of 20/200 would require a lens of +10 diopters or 2.5 times magnification. This formula is to be used only as a guide, using trial and error methods to further refine the measure.

There are many other factors which determine whether or not a person can use aids successfully. One very important aspect is that of proper lighting. Most partially-sighted people find that increased lighting improves the contrast and makes materials easier to read. The problem of glare is usually solved by using a high intensity lamp near the reading material rather than a strong overhead light which reflects on the magnifier. A slitted piece of black paper, called a typoscope, is sometimes helpful in reducing glare and increasing contrast and readability. A few students who are photophobic may prefer dim lighting. It is usually best to make the student aware of the different lighting conditions which are available, have him try reading under various conditions, and determine which one is best for him.

Another important factor is finding an aid which is both convenient and practical for this individual's particular purposes. If he is interested in reading price tags on articles in a store, he will need an aid that is portable, perhaps a magnifier that will fit easily in his pocket. On the other hand, if he needs to do a great deal of reading at home or in his office, a larger stationary aid which will give him a greater field of vision might be better. A system such as the closed-circuit TV set-up might be practical in this latter situation.

A person must also be given time and opportunity to learn to use their new aid. Many people do not use their prescribed aids because they have not learned how to do so with ease. A simple suggestion such as using a reading stand or moving the reading matter instead of their head will help these people. Other people may function better if they understand some of the simpler optical principles about their aid and its uses, focal length, etc. All of these things should be explained by the low vision specialist as needed.

After a suitable aid has been prescribed, the student should be encouraged to use it regularly, Some of the lessons in the back of this manual are designed to give the student practical experience with their aids. Others can be developed for students who are having difficulties learning to use the aids. As much as possible, the other training areas in the Center should also encourage the students to use aids in their classes. For example, distance aids can be used on mobility lessons for reading street signs and locating specific stores and buildings; certain stand-type magnifiers might be useful in the shop area for assembling the belt and lacing the wallet.

BASIC TYPES OF AIDS

1. Spectacles
    - A. Microscopic lenses
    - B. Telescopic lenses
    - C. Aphakic lenses
    - D. High-plus lenses

2. Head-bornes optical aids
    - A. Loupes
    - B. Telesight magnifiers
    - C. Clip-on telescopes (reading caps included)

3. Hand-held magnifiers
    - A. Folding pocket magnifiers
    - B. Hand magnifiers and readers
    - C. Flashlight-type illuminated magnifiers
    - D. Other types of lighted magnifiers

4. Stand type magnifiers
    - A. Bar magnifiers
    - B. Paperweight magnifier
    - C. Lighted stand magnifiers
    - D. Non-illuminated stand magnifiers

5. Distance aids
    - A. Monocular
    - B. Binoculars
    - C. Clip-on telescopes

6. Non-optical aids
    - A. High intensity lamps
    - B. Typoscopes
    - C. Reading stands and book holders
    - D. Heavy-lined writing paper
    - E. Felt tip pens
    - F. Sun glasses and other specially tinted lenses
    - G. Visors

IMPROVEMENT OF VISUAL PERCEPTION THROUGH TRAINING

Now that we have some idea of the student's visual problems and the type of aid he may find helpful, we will begin to formulate a plan of training. A separate plan should be outlined for each student using the following lesson plans as guides and developing special lessons if necessary. Note the student's special areas of difficulty and select those lesson plans which should improve his skills in these areas. Pay special attention to his visual capacities; do not select lessons which will be too easy or too difficult for him. Repeat each lesson plan as often as necessary for the student to develop the necessary skills. Use creativity in varying the lessons as much as possible so that neither you nor the student become bored with the learning process. NO STUDENT SHOULD USE EVERY LESSON PLAN. The lessons are designed for persons with extremely diverse visual problems. Each student should be treated as an individual with a unique visual loss. For example, if in evaluation you find that the student can discriminate simple forms, do not include lesson #1 in your training program. However, you may want to include lesson #4 as it deals with more complex discrimination.

In formulating a program, it is helpful to develop a work sheet on which to record the results of the evaluation. A sample of one type is found on the next page.

As much as possible, the lessons should be of practical use to the student. Encourage him to apply his learning to daily living.

SAMPLE WORK SHEET

NAME____________________ DATE ENTERED__________________ AGE__________

EYE CONDITION______________________ DURATION____________________________

EVALUATION

1. Acuity Distant: OD_____ OS_____ Near: OD_____ OS_____

   Chart used_______________

2. Field ____
3. Color discrimination____
4. Figure-ground____
5. Form discrimination ____
6. Reading: Without aid_______________With aid (specify)__________________
7. Tasks presently performed____

PRESCRIPTIVE PLAN

1. Goals____
2. Lessons to be used____
3. Aids to be used **A. Near** ____

   B. Distant____
4. Non-optical aids used____
5. Best lighting conditions____
6. Glasses prescribed (if any)____

ADDITIONAL COMMENTS:

AIDS TO BE PRESCRIBED FOR VETERAN BEFORE LEAVING THE CENTER:

PERCEPTUAL TRAINING

PRINCIPLES INVOLVED:

1. Training peripheral vision to notice more detail
2. Color discrimination
3. Form discrimination
4. Co-ordination of visual and tactual skills
5. Developing scanning techniques
6. Depth perception
7. Spatial perception
8. Figure-ground discrimination
9. Improvement of reading skills

LESSON NUMBER	MATERIALS USED	PRINCIPLES INVOLVED
1, 2	Geometric shape cards	1, 2, 3, 8
3	Form puzzles	1, 2, 3, 4, 5, 7
4	Simple animal and fruit puzzles	1, 2, 3, 4, 5, 8
5, 6	Spatial-directional pattern board	1, 2, 3, 4, 5, 6, 7, 8
7	Simple sequential pictures	1, 2, 3,
8	Jigsaw puzzles	1, 2, 3, 4, 8
10	Fitzhugh Plus Program	1, 3, 5, 6, 7
11	Word Tracking booklet	4, 5, 9
12	Symbol Tracking booklet	4, 5, 9
13	Maps	1, 5
14	Tables and Graphs	1, 5
15	Magazine pictures (increasing complexity)	1, 2, 3, 5, 8
16	Crossword puzzles	1, 4, 5, 9
17	Playing cards	1, 2, 3, 8
18	Weekly Reader Speed and Comprehension	1, 5, 9
19	Large Print Dictionary	1, 5, 9

LESSON PLAN 1

OBJECTIVE: Improvement of simple form discrimination

DESCRIPTION OF MATERIALS USED: Geometric shapes in color. Set of 36 3" cards consisting of six colors and six shapes. Each card is white with a colored border and a shape of the same color in the center. Shapes used - circle, square, triangle, rectangle, diamond, hexagon. Colors used - purple, blue, green, red, orange and yellow.

SOURCE OF MATERIALS:
Ruth Cheves Program (RC 1-4)
Teaching Resources Corporation
100 Boylston Street
Boston, Mass. 02116

PROCEDURE: Start with all six cards of the same color. Since the purple-and-white provides the most contrast, it is usually best to start with that color. Have the student examine each one of the cards separately and then all together. Instruct him to use the contrast to determine the shape. This can be done by noticing the relative distance between the shape and the border of the card. With dark colors, use a light working area. (If the table is dark, place cards on a piece of white paper so border of each card is noticeable.) Sometimes the student can use his fingers to measure the relative distances. Have the student start at the top left side of the card and move his finger slowly down toward the lower left corner. As he does so, ask him to notice any changes in the distance between the white background and the colored shape. Rotate the card 90° and continue this process until the entire card has been examined in this fashion. Have the student look for corners and angles in the various shapes. It also helps to compare similar shapes, such as the circle and the hexagon, the square and the rectangle, and the diamond and the triangle.

After the student is familiar with these six basic shapes, add card of the other colors and have him identify their shapes. As much practice as is necessary can be given in this way. For example, have him select all the circles, all the squares, etc. Some colors with less contrast (such as yellow) are more difficult. Certain students will be unable to distinguish these shapes.

LESSON PLAN 2

OBJECTIVE: Improvement of basic color discrimination.

DESCRIPTION OF MATERIALS USED: Geometric shapes in color. Set of 36 3" cards consisting of six colors and six shapes. Each card is white with a colored border and a shape of the same color in the center. Shapes used - circle, square, triangle, rectangle, diamond, hexagon. Colors used - purple, blue, green, red, orange, and yellow.

SOURCE OF MATERIALS:
Ruth Cheves Program (RC 1-4)
Teaching Resources Corporation
100 Boylston Street
Boston, Mass. 02116

PROCEDURE: First determine which colors the student has the most difficulties with. Do this by giving him all six cards of the same shape and ask him to name the color of each. It is important to begin by using the same shape; different shapes can stimulate different parts of the retina and create unnecessary problems. For example, it has been noticed that some students see a difference in the hue of the red triangle and the red rectangle. Only by close comparison of the cards can they determine that the colors are the same. Many students confuse purple and blue, and red and orange.

Mix all the cards of the two colors the student has the most difficulty with. Ask him to separate them into piles according to the colors. The student can check his own work if he can distinguish the shapes; if he has sorted the cards correctly, there should not be two of the same shape card in the same pile.

This activity can be repeated using two different colors or adding more than two colors to create more complex learning situations.

After the student has compared and contrasted the colors in this type of activity, present the colors to him individually to determine if he has learned to distinguish them separately. You might even vary the lighting conditions and the color of the background upon which the cards are placed.

LESSON PLAN 3

OBJECTIVES:

1. Improvement of color and form discrimination
2. Coordination of tactual and visual skills

DESCRIPTION OF MATERIALS USED: Large form puzzles. Set of 24 3" squares, consisting of four cards of each of six colors (purple, blue, green, red, orange, yellow). Each card is divided by a diagonal, half the card is white and half is colored. Also small form puzzles. This set is identical to those described above except they are 2" squares.

SOURCE OF MATERIALS:

Ruth Cheves Program (1)
Teaching Resources Corporation
100 Boylston Street
Boston, Mass. 02116

PROCEDURE:

Begin with the large form puzzles. Using four quarters of one color, make a design. Give the student four pieces of another color and ask him to copy the design. If he is able to do this without difficulty, proceed to the next step.

Construct another model using two colors (perhaps those that the student is known to confuse). Give the student pieces of the same two colors and ask him to copy the design, paying special attention to the correct color positions. Continue these exercises, using more and more complex patterns. To add to the difficulty of the task, give the student more squares than he needs and ask him to select only those needed to complete the pattern.

Repeat the entire procedure with the small form puzzles if the student is able to see them.

LESSON PLAN 4

OBJECTIVES:	1. Development of more complex form discrimination 2. Coordination of visual and tactual skills 3. Recognition of relationships of part to whole
DESCRIPTION OF MATERIALS USED:	Fruit and animal puzzles. Set of seven simple objects, in color, each one on a 6" x 9" card. (Objects are: apple, orange, peach, rabbit, horse, dog, and cat.) Each one of these objects is further divided into a series of puzzles of varying levels of difficulty.
SOURCE OF MATERIALS:	Ruth Cheves Program Teaching Resources Corporation 100 Boylston Street Boston, Mass. 02116
PROCEDURE:	Give the student one of the pictures (level 1) and ask him to identify it. It is generally best to start with the apple picture. Have him notice specific details of the object, paying special attention to the relationship of its parts; you might also point out the presence of the black border around the entire picture. If the student is unable to identify the object correctly even after this discussion, tell him what it is. Explain that you are going to "cut" the picture into various pieces and ask him to re-assemble it. He may keep the original picture and refer back to it if necessary. Proceed through all six levels of the picture in a like manner at the student's rate of speed. This may take the entire class period.

Further lessons can be repeated using the other pictures. The student's efficiency should improve with each picture. Supplementary work can be done with these materials if needed. For example, pieces of two different pictures could be mixed. The student would then have to sort out the non-essential elements before assembling the picture.

LESSON PLAN 5

OBJECTIVES:

1. Coordination of tactual and visual skills
2. Color discrimination
3. Form discrimination
4. Spatial perception

DESCIPTION OF MATERIALS USED: Directional-spatial pattern board. Wooden board (9" square) with five rows of five metal pegs. There are a series of cardboard patterns of various geometric forms and lines which fit on the pegs. The forms are in three colors - blue, green and red. The kit includes packets of colored rubber bands which are to be stretched around the pegs.

SOURCE OF MATERIALS:

Dubnoff School Program 2
Teaching Resources Corporation
100 Boylston Street
Boston, Mass. 02116

PROCEDURE:

Begin by familiarizing the student with the pegboard and the packets of blue, green and red rubber bands. If the student has difficulty distinguishing the blue from the green, have him place one packet on the left of the pegboard and one on the right so he can remember which is which.

Start with the solid form patterns. Place one on the pegboard and ask the student to stretch a rubber band around each form. If the form is red, he should select a red rubber band, etc. Continue until the student is able to do this with ease.

Continue the same process using the heavy line patterns, and finally the thin line patterns. Some students may not be able to distinguish the colors of the thin line patterns. Increased practice will improve this skill somewhat. However, if a person cannot see the difference after several attempts, this activity should be discontinued.

LESSON PLAN 6

OBJECTIVE: Figure-ground discrimination

DESCRIPTION OF MATERIAL USED: Directional-spatial pattern board. Wooden board (9" square) with five rows of five metal pegs. There are a series of cardboard patterns of various colored lines in random designs. The kit includes packets of red, blue, and green rubber bands which are to be stretched around the pegs.

SOURCE OF MATERIALS:
Dubnoff School Program 2
Teaching Resources Corporation
100 Boylston Street
Boston, Mass. 02116

PROCEDURE: There are 12 patterns which are specifically designed to be used for practice with figure-ground discrimination. (Six cards - FG 1 to 6 - with designs on both sides.)

Present a card and have the student read the directions at the bottom of the card and then perform the specified task. If he has enough sight to see these lines, he should be able to work on this lesson quite independently. If he has some difficulty seeing the lines when the pattern is on the board, allow him to pick it up and examine it more closely in the light.

LESSON PLAN 7

OBJECTIVES:

1. Development of ability to discriminate finer details
2. Improvement of color and form discrimination
3. Development of ability to organize visual information

DESCRIPTION OF MATERIALS USED: Sequential pictures. Set of 22 8" x 10" pictures on glossy paper. Set consists of 6 separate series of various subject matters. Five series are colored, one is black-and-white.

SOURCE OF MATERIALS: Adapted by instructor. They are photographic blow-ups of **smaller** items found in Fitzhugh PLUS Program, Book 104, items #381 to # 386. Hand colored with grease pencils.

PROCEDURE: Use just one **series** of the cards at a time. Begin with the least detailed one, the flower sequence. Introduce one of the pictures and have the student identify it. If necessary, after allowing the student to examine it, you may discuss the picture with him, making certain that he has noticed as much detail as possible. Present him with the other pictures in the sequence in random order. Tell him that they all deal with the same subject matter, and when placed in the proper order, tell a story about the subject. Ask him to examine each picture carefully and put them in such an order. After he has completed this task, ask him to explain his rationale for that particular sequencing. If he has incorrectly ordered them, help him to distinguish those details which are essential to perform the task efficiently.

Continue this procedure using the other five series of pictures. Proceed from the less detailed to the more detailed, and from the colored to the black-and-white items. Less guidance from the instructor should be given as the lesson proceeds.

Variation can be provided by combining two or more series and having the student separate the subject matter before placing the cards in the proper sequence.

LESSON PLAN 8

OBJECTIVES:

1. Color and form discrimination
2. Coordination of visual and tactual skills
3. Figure-ground discrimination

DESCRIPTION OF MATERIALS USED: Jigsaw puzzles, ranging from simple to more complex, in high-contrast colors whenever possible.

SOURCE OF MATERIALS: Collected by the instructor.

PROCEDURE:

Familiarize the student with complete jigsaw picture puzzle. Make certain that he pays particular attention to the shape, color, and position of each item in the picture as a whole. Call his attention to as many specific details of the picture as he is able to notice.

Break the puzzle apart, scramble the pieces, and let the student reassemble it independently. Notice how he organizes the pieces-- whether he groups them according to color, for example. If he doesn't seem to have any systematic way of proceeding, you might offer some suggestions that would make the task a little easier for him.

Make sure that the student understands the reasons for this exercise and the **aims it** is meant to accomplish. If the student seems to resent this type of activity, it is usually better to discontinue it.

Practice of this type not only improves visual discriminatory abilities, but also, helps the student develop better organizational skills.

LESSON PLAN 9

OBJECTIVE:

1. Improvement of visual discriminatory abilities
2. Developing basic reading skills

DESCRIPTION OF MATERIALS USED: Letters of the alphabet on individual 3"x5" file cards. The size of the letters are 2", 1½", 1", ½", and ¼". Also individual words in 18 point type on file cards.

SOURCE OF MATERIALS: Prepared by the instructor, using Lettreset standard medium print sets in 192 pt., 144 pt., 96 pt., 48 pt., and 24 pt. type respectively. The 18 pt. type words were taken from the large print edition of the New York Times weekly newspaper.

PROCEDURE: Determine the smallest size type the student can read with ease. Using that size, make simple three or four letter words with the cards and ask the student to read them. Next, make another word, using letters of that size, except place a letter of the next smallest size in the middle of the word. Ask the student to read the word by guessing the middle letter. Continue this until the student feels comfortable and **feels** that he can actually see the smaller letter. Then, make an entire word of the smaller letters.

When the student is able to read these words, begin the entire process again using even smaller letters until you reach the threshold of his abilities. When he gets down to 18 pt. type, present entire words and groups of words on one card. Proceed to sentences, then paragraphs, then large print books and/or newspapers.

All students may not be able to finish this lesson; some will need several lessons before they can discriminate smaller letters accurately. It may be useful for some students to work on this activity each class period for about ten or fifteen minutes and then proceed to other visual activities rather than continuing this lesson for the entire class period.

LESSON PLAN 10

OBJECTIVES:

1. Figure-ground discrimination
2. Spatial and depth discrimination
3. Practice noticing detail
4. Scanning practice
5. Form discrimination - more complex type

DESCRIPTION OF MATERIALS USED: Fitzhugh PLUS Program, Book 104. Emphasis will be on the following sections: items #181-220, #221-248 and #281-300.

SOURCE OF MATERIALS: Prepared by Kathleen Fitzhugh and Loren Fitzhugh. Published by Allied Education Council Distribution Center, Galien, Michigan 49113.

PROCEDURE: This particular material can be used in a variety of ways depending on the student's needs. Not all students will need to go through each section. The items themselves are self-explanatory. General directions are given at the beginning of each section. The student is asked to scan the geometric figures in each item and to select the one that correctly completes the question.

Items #181-220 are particularly good for improving figure-ground discrimination, and should be used with students who have had some difficulty with the Frostig test in evaluation.

Items #221-248 deal largely with spatial and depth perception. They can be useful in helping the student realize how the same figure or object can look different when viewed from a different visual angle.

Items #281-300 are useful for picking up distortions and field defects that the student may experience. In many cases, they can be taught to compensate for these distortions if enough practice exercises are provided.

Throughout all the exercises, the student should be encouraged to scan the items from left to right. This skill will especially help when the student begins to develop his reading skills.

LESSON PLAN 11

OBJECTIVES:

1. Improvement of reading speed and comprehension
2. Development of scanning technique
3. Coordination of visual and tactual skills

DESCRIPTION OF MATERIALS USED: Self-instruction workbook titled "Word Tracking". It consists of series of sentences in bold print. Below each sentence are several lines of words. The student is asked to circle words that appear in the sentences above as quickly as possible.

SOURCE OF MATERIALS:

Editor: Donald E. P. Smith

Publisher: Ann Arbor Publishers
611 Church Street
Ann Arbor, Michigan 48104

Distributor: Creative Associates
P.O. Box 281
Aptos, California 95003

PROCEDURE: If a student can read 18 pt. type with or without aids at any speed, this material should be considered for his program. It is not necessary to begin on page 1; some students may find the vocabulary too elementary to be of interest. However, it is important to start at the top of the page each time and complete the entire page before going on to another.

Follow the general direction in the introduction of the booklet. Tell the student that each sentence in the bold type has a number. He is to read the sentence, then find each word of that sentence in the lines below and draw a circle around it. He should then go on to the next numbered sentence and continue without stopping until he has completed the entire page. Encourage the student to scan from left to right and work as quickly as possible. Whenever possible the student should be timed and his speed recorded. Practice with word tracking exercises should improve his speed in all reading activities.

LESSON PLAN 12

OBJECTIVES:

1. Improvement of fine visual discrimination
2. Development of scanning techniques
3. Coordination of visual and tactual skills

DESCRIPTION OF MATERIALS USED: Self-instruction workbook titled "Symbol Tracking". It consists of numerous series of line drawings, letters, and numbers. The student is presented with several figures and asked to locate them in a group of figures below and circle them.

SOURCE OF MATERIALS:

Editor: Donald E.P. Smith

Publisher: Ann Arbor Publishers
P.O. Box 1446
Ann Arbor, Michigan 48106

Distributor: Creative Associates
P.O. Box 281
Aptos, California 95003

PROCEDURE: Begin with page 7. Have the student look at the three figures above the heavy black line. Make certain that he can identify them; some students may want to name them, others may not. Ask him to circle those same figures in the following two lines of items.
He is to circle them in the order in which they appear at the top. For example, the figures are a shoe, a cat, and a sailboat. If, as in the lines below, the first item is a sailboat that comes after the shoe and the cat. This method encourages the student to develop a left-to-

right scanning technique and avoid random scanning. Continue down the page, circling the same figures in the second set of items, etc. As the work proceeds down the page, finer and finer visual discrimination is necessary. Even if the student cannot see the items clearly, he can sometimes make intelligent guesses, judging from the general contour of the items.

Proceed in the same manner through the booklet, using letters and numbers as well as line drawings. If the student finds it beneficial, he may use optical aids, in this work. Whenever possible, the student should be **timed and** encouraged to go as fast as he can, even though he feels uncomfortable at first. His speed should improve with practice.

LESSON PLAN 13

OBJECTIVES:

1. Development of scanning techniques
2. Improvement of ability to discriminate fine detail
3. Recognition of relationships of part to whole

DESCRIPTION OF MATERIALS USED:

Maps of all kinds. Begin with large print simple maps, either from childrens' books or large print World Atlas. Proceed to regular print city street maps and travel route maps whenever possible.

SOURCE OF MATERIALS:

World Atlas - in large type:
Keith Jennison Book
Franklin Watts, Inc. Publishers
575 Lexington Avenue
New York City, New York

Other large print maps from:
Weekly Reader
Education Center
Columbus, Ohio 43216

Regular print maps from local sources.

PROCEDURE:

Begin with the larger maps. Familiarize the student with the general layout of the map. Have him read the items on the map key and locate them on the map; also point out the scale of miles and the compass directions. With each of the larger maps, there is a series of questions that can be used to give the student practice using the map keys. The student should be encouraged to use optical aids if he finds them helpful.

Proceed to the regular, more complex maps. If the student cannot read the small print, have him locate larger objects such as parks, lakes, etc. If he is able to read the finer print, familiarize him with the street index and have him locate specific street corners using the map coordinates. After he has done this with several locations, have him find the best travel route from one point to another. Discuss the advantages and disadvantages of alternate routes. Keep the map activities as relevant as possible to the student's interests and needs.

LESSON PLAN 14

OBJECTIVES: 1. Development of scanning techniques

2. Improvement of reading skills

DESCRIPTION OF MATERIALS USED: Tables and graphs of all types, ranging from large, simple charts to bus schedules and timetables.

SOURCE OF MATERIALS: Collected by instructor from various sources.

PROCEDURE: Follow the same procedure as the previous lesson with the maps. Begin with the larger charts. Familiarize the student with the format of the chart and the type of information it contains. Use the series of questions provided with each chart to give the student practice interpreting the chart.

Gradually introduce more and more complicated tables and more detailed graphs. Encourage the student to read the smallest possible print, either with or without aids. Impress upon him the practical value of reading this type of material whenever possible.

LESSON PLAN 15

OBJECTIVES:

1. Training vision to notice more detail
2. Figure-ground discrimination
3. Organizing visual stimulus in logical pattern

DESCRIPTION OF MATERIALS USED: Various pictures from magazines and other sources, both in color and in black-and-white, from simple objects to scenes of increasing complexity.

SOURCE OF MATERIALS: Gathered from all available sources by the instructor; many come from recent issues of magazines such as *Time*, *Life*, and *National Geographic*. They can be geared to the individual student's ability and interests.

PROCEDURE: Begin with the simplest picture that you feel the student can identify. Ask him to identify the picture and describe as much detail as he possibly can. If he misses some aspect, point it out and ask him to "guess" what the object could be. Teach him to use principles of continuity and context to make intelligent guesses. For example, if you present a picture of an old man, the student does not have to see the object in his mouth clearly to guess that it is probably a pipe.

Continue this procedure, using more and more complex pictures. Encourage the student to use color and form cues when he cannot see things clearly. If his field of vision is severely restricted, help him develop a systematic scanning technique. Use materials of varying contrast and different quality of papers.

LESSON PLAN 16

OBJECTIVES:

1. Development of scanning techniques
2. Coordination of visual and tactual skills
3. Improvement of reading skills

DESCRIPTION OF MATERIALS USED:

Large type crosswords #1.

Book of 50 crossword puzzles in 18 pt. type. The puzzle grid lies flat on the table and the columns of words rest against an easel-back binding of the booklet in an upright position for easy reading.

SOURCE OF MATERIALS:

Edited by Margaret Farrar. A New York Times Book, published by Simon and Schuster, New York. Available in many bookstores and variety stores in the locality.

PROCEDURE:

Use this material only if the student has a fairly good vocabulary and enjoys word games. Otherwise, the student will become frustrated and is likely to associate the frustration with visual rather than intellectual inability.

Present the booklet to the student and have him open it correctly so that the easel-back supports the word cues. Allow him to work as independently as possible, completing the crossword puzzle in the usual manner. Encourage him to use magnifiers and extra lighting if such is helpful to him. In this lesson, he will probably see how important and effective an organized scanning technique can be.

If these puzzles are too difficult for some students, other large print puzzles are available. The type developed for children at about a sixth-grade level are ideal because they are usually large enough for most low vision students.

In rare cases, there may be a low vision person with extremely good acuity but a very narrow field. Here regular-size crossword puzzles would be useful. The student can get practice developing a systematic scanning technique while he is completing the puzzles.

LESSON PLAN 17

OBJECTIVES:

1. Complex form discrimination
2. Development of ability to discriminate detail
3. Practice in accommodation--near to distant vision

DESCRIPTION OF MATERIALS USED: Jumbo index playing cards. Variations might also include use of cribbage board and other scoring devices.

SOURCE OF MATERIALS: Cards from U.S. Playing Card Company, Cincinnati, Ohio; available at local stores. Cribbage board from American Foundation for the Blind.

PROCEDURE: First introduce individual cards to the student and determine whether or not he can identify them. Some students may spend an entire lesson on just learning to tell one suit or number from another visually.

After student can readily identify cards, begin playing a simple game with which he is familiar. If the game requires that cards be laid on the table, determine if the student can see them from that distance. This will require a certain amount of scanning. The student will also be required to glance from his hand (near) to the board (more distant objects); therefore, his powers of accommodation will be exercised.

When the student has become comfortable with the cards, you may introduce more complex tasks such as score-keeping with paper and pencil or a cribbage board.

Here the student will have to perform some task that requires visual-tactual coordination and will further develop his skills.

Many student will find this an interesting lesson because they are developing social skills which can be used after they leave the Center while they are getting some practice in visual discrimination.

LESSON PLAN 18

OBJECTIVES:

1. Improvement of reading comprehension
2. Development of skill with optical aids
3. Improvement of reading speed

DESCRIPTION OF MATERIALS USED: Diagnostic silent reading test--4th and 6th grade level. A series of short paragraphs with questions following about the reading matter.

SOURCE OF MATERIALS: Weekly Reader school magazine, published in Columbus, Ohio.

PROCEDURE: Encourage the student to use the optical aid which has been selected for him. Make certain he is in a comfortable reading position, using the proper lighting and reading stand and/or typoscope, etc.

Beginning with the first paragraph have him read the selection at whatever speed he is capable of. Watch how he uses the aid and suggest easier methods if needed. After he has completed the paragraph, have him answer the questions below it. The student should read aloud so that the instructor can correct errors and see where his difficulties lie. If the student has trouble answering the questions, have him re-read the selection before going on to the next one.

Some students are not able to comprehend any of what they are reading in the beginning, and this may prove to be a very frustrating experience for them. To help them, initially, the instructor may first read the selection rapidly to them; they will get a general idea of the context but will not be able to memorize it. When they re-read it, they will better understand it. After several success experiences with this, the student should try a paragraph on his own.

Readings can be timed with a stopwatch. Both speed and comprehension should improve with practice. Progress can be checked by giving the student a reading passage in a general interest book or magazine and asking him to discuss the subject matter.

LESSON PLAN 19

OBJECTIVES:

1. Improvement of skill with optical aids
2. Improvement of scanning techniques
3. Practical experience with utility reading

DESCRIPTION OF MATERIALS USED: Large print dictionaries. The Grolier Large Type Dictionary (18 pt.) and Webster's New American Dictionary--large type edition (12 pt.)

SOURCE OF MATERIALS: Grolier--available from Franklin Watts, Inc., Publishers, 575 Lexington Ave., New York, N.Y. 10022. Webster's-- available from National Aid to the Visually Handicapped, 3201 Balboa St., San Francisco, Calif.

PROCEDURE: Have a list of words for the student to look up. Ideally, these could be words that he has come across in his readings with which he was not familiar. To keep him highly motivated, they should be words that he will use in the future. Familiarize him with the general layout of the dictionary. Encourage him to use the guide words at the top of the page to locate specific words. Point out relevent facts, such as the fact that the alphabetic words are in bold type and usually stand out in the column. Teach him to scan the columns rapidly until he locates his word. If necessary, you may have to teach the student how to use the keys to pronunciation and abbreviations in the front of the book.

The Webster dictionary is preferable because it has more words and the quality of the print is better. However, if the student needs the largest possible type, the Grolier can be used. Other large print dictionaries are available on the market.

It is a good idea to have the student write out the definition--either on paper or on a blackboard. This will give him practice with note-taking and writing skills. He also gets practice with eye-hand coordination and changing of focus from near to far. He will also be given an opportunity to re-read his own handwriting; if necessary, additional lessons can be planned to improve his penmanship.

SUGGESTED READINGS

Barraga, Natalie. Increased Visual Behavior in Low Vision Children. New York: American Foundation for the Blind, 1964.

Feinbloom. "Technique of Examination of the Partially Blind Patient". New York: Designs for Vision, Inc.

Gregory, R.L. Eye and Brain. New York: McGraw-Hill Book Company, 1966.

Harrington, David O. The Visual Fields. St. Louis: The C.V. Mosby Company, 1964.

Simson, Russell L. Optical Aids for Low Acuity. Los Angeles: Braille Institute of America, 1957.

Sloan, Louise L. Aids for the Partially Sighted. New York: National Society for the Prevention of Blindness, 1966.

Stein, Harold and Slatt, Bernard. The Ophthalmic Assistant. St. Louis: The C.V. Mosby Company, 1968.

EDUCATIONAL TRAINING

TRIAL SET

A trial set contains the following:

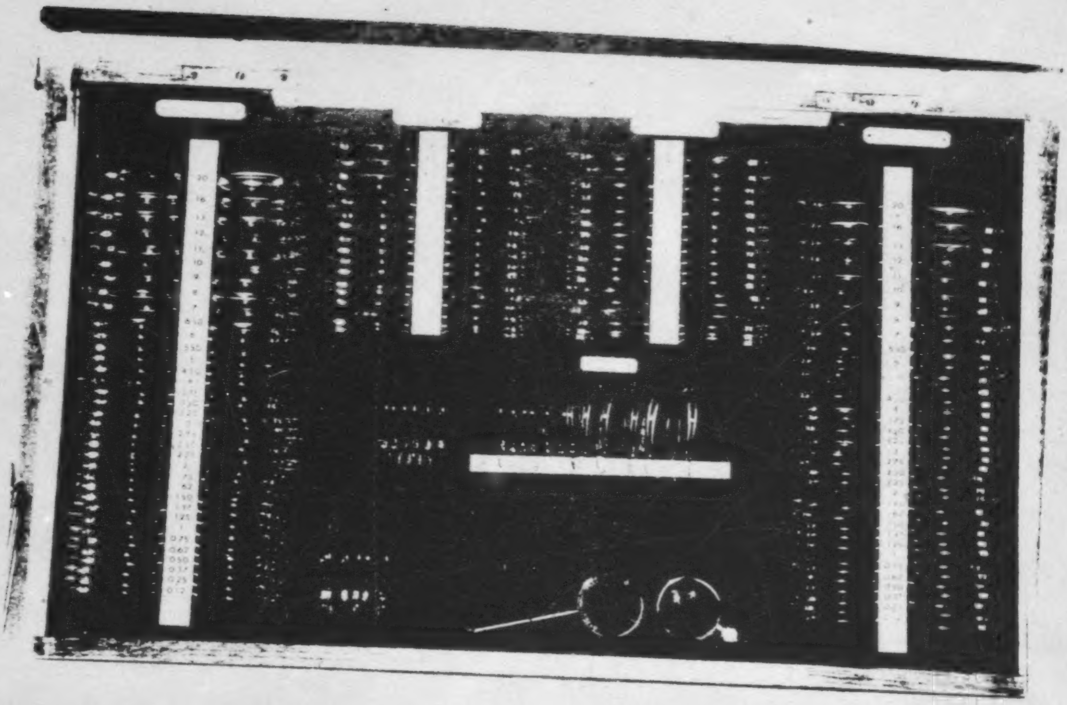
1. a pair of plus spheres (+0.12 +20.00)
2. a pair of minus spheres (-0.12 -20.00)
3. a pair of plus cylinders (+0.12 +8.00)
4. a pair of minus cylinders (-0.12 -8.00)

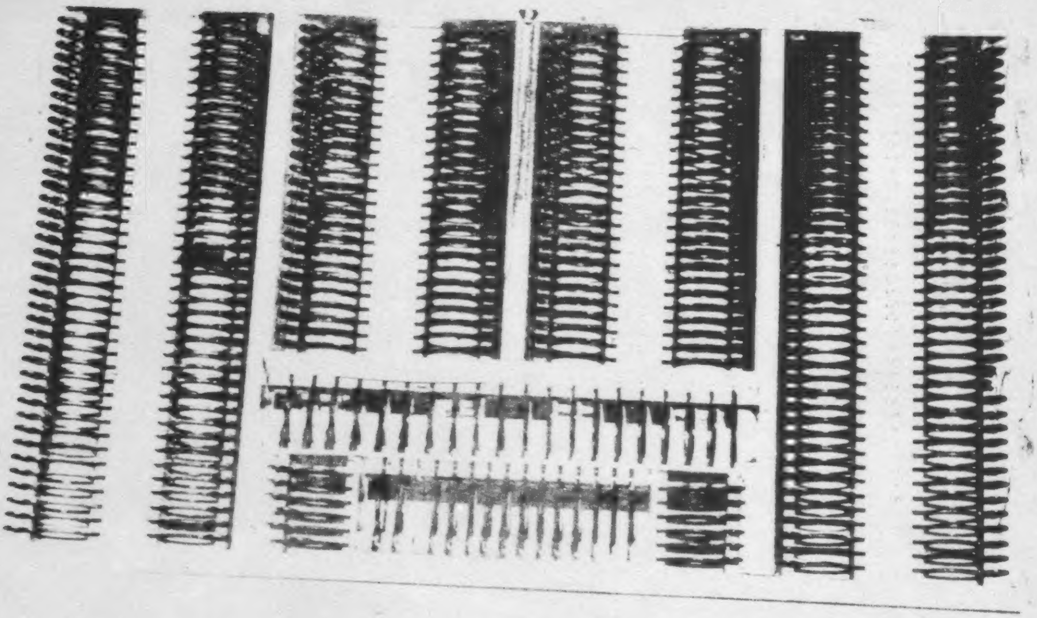
A sphere lens is a segment of a sphere (ball) refracting rays of light equally in all directions. There are both plus spheres and minus spheres. Plus spheres are used to correct hyperopia (farsightedness). Minus spheres are used to correct myopia (nearsightedness).

A cylinder lens is a segment of a cylinder (tube), the refractive power of which varies in different directions. For this reason, a cylinder lens must be used at the correct axis for the individual. Cylinders are used to correct astigmatism.

Accessories - are things such as occluders, pinholes, slits, etc. Prisms are also included in a trial set. Prisms are basically used to correct muscle imbalance, with the low vision person.

TRIAL SETS

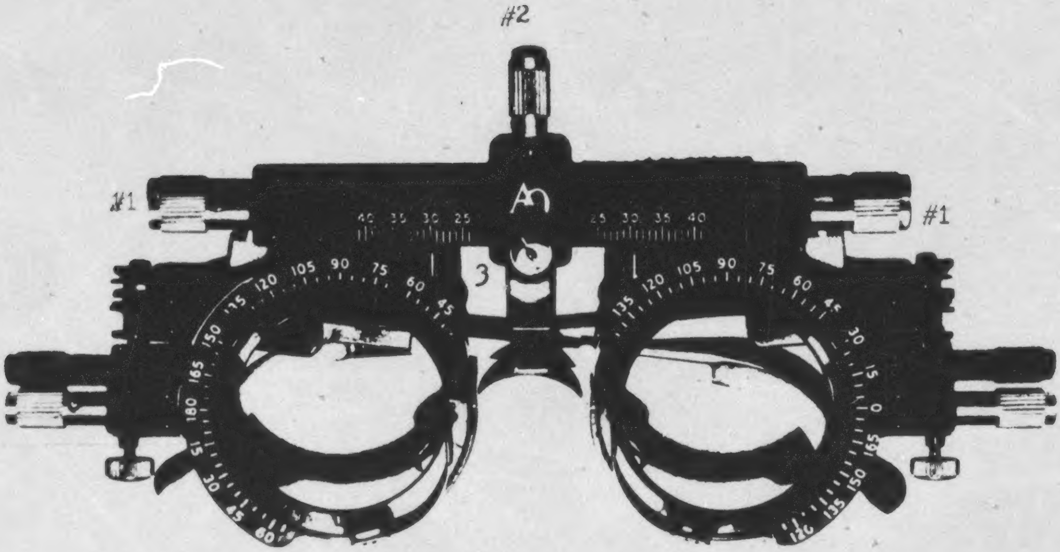




TRIAL FRAMES

1. Adjust the temples simply by sliding them.
2. Center each eye individually within the frame, by making a pupillary distance adjustment (1) and an upward or downward adjustment (2).
3. Adjust the tilt of the lenses downward slightly, for reading ease.
4. Adjust the nose angle if necessary (3)
5. Place the lenses into the frame. Remember that the strongest lens should go in the slot nearest the eye. The most convex side of the lens goes away from the eye. Set the correct axis if a cylinder is being used. (This is done by matching the line on the lens with the correct axis number on the trial frame.)

TRIAL FRAME


#2
#1
#1
3
40 35 30 25
25 30 35 40
165 150 135 120 105 90 75 60 45 30 15 0 180

LENSOMETER

A lensometer is an instrument designed to measure the prescription of an optical lens. Lenses are made up of either spheres or cylinders, or a combination of both. By using a target area in the lensometer, one can find the exact prescription of any lens. American made lensometers use a target consisting of a single line in one direction, and three parallel lines in the opposite direction.

To begin measuring lenses, follow the basic steps on the following pages.

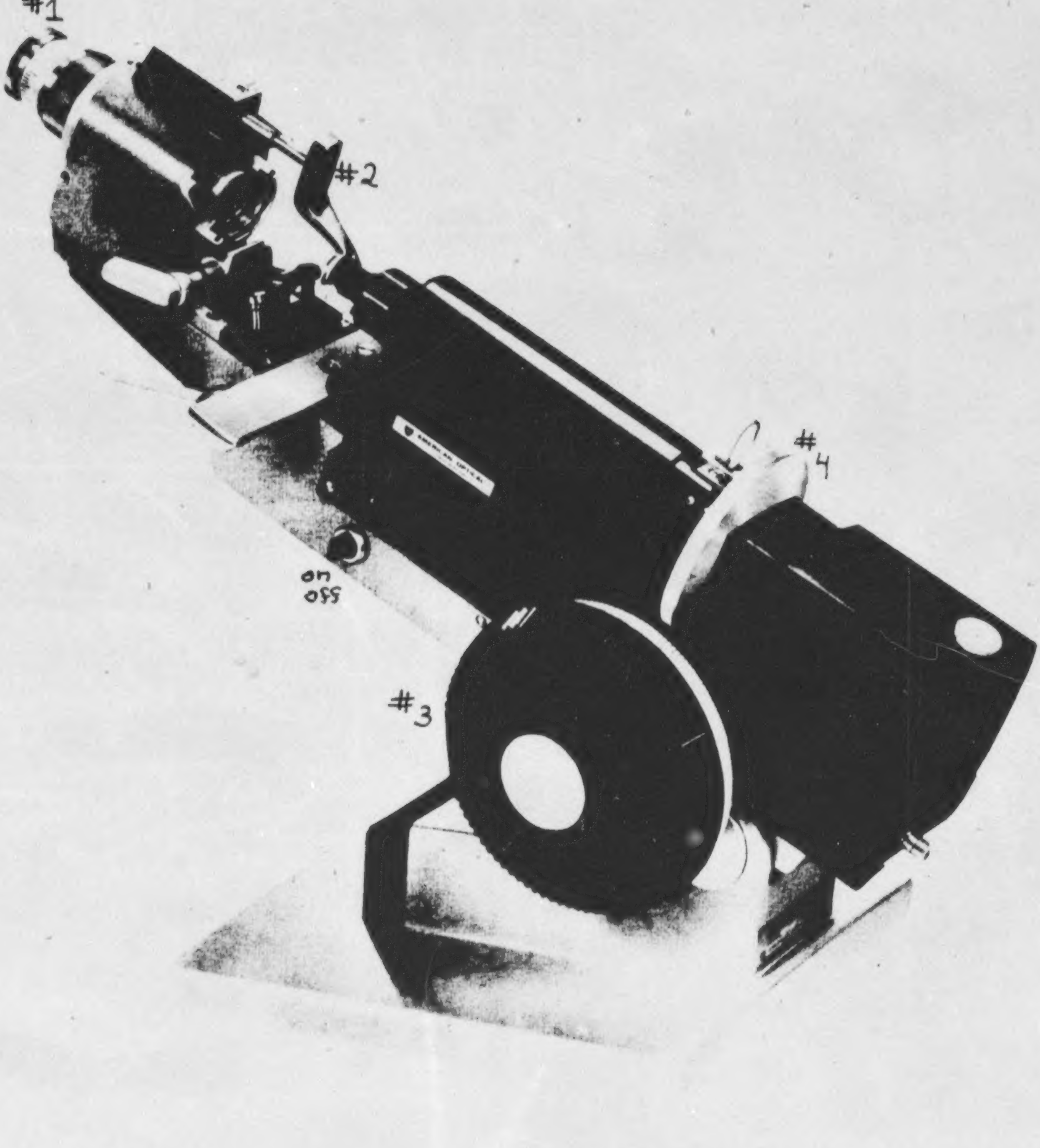
LENSOMETER

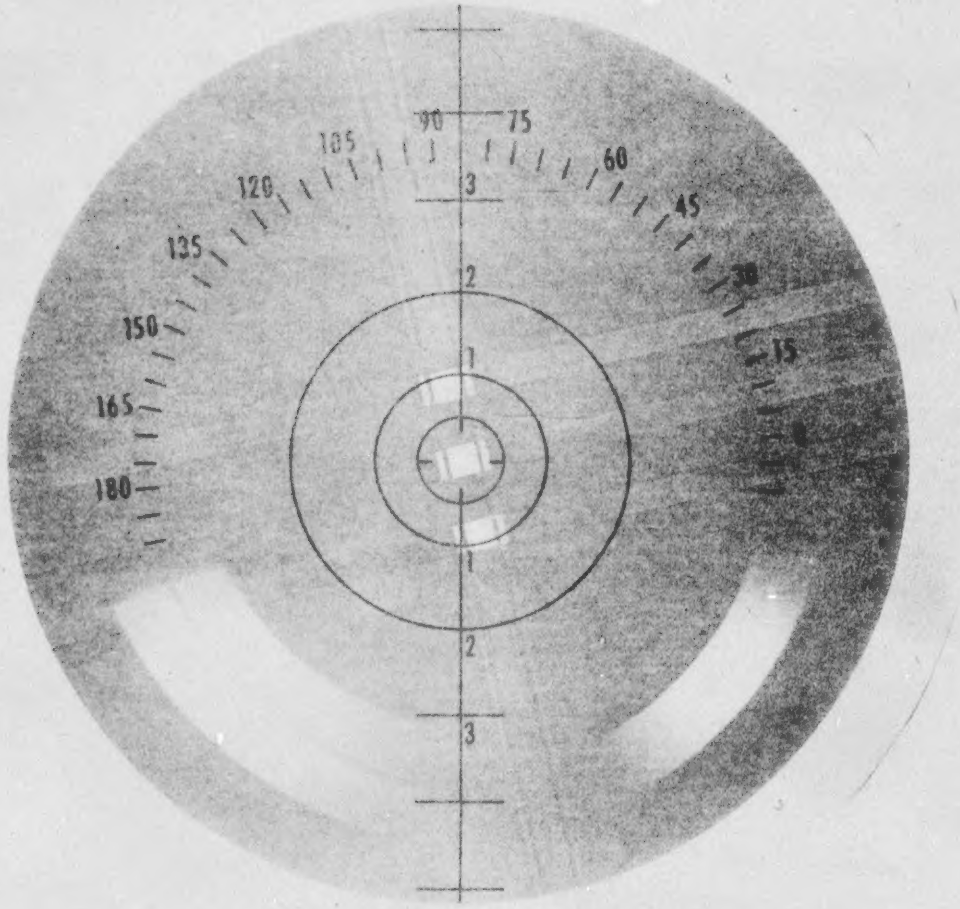
Prescription of a sphere only (+4.00)

1. Focus eye piece (#1) for your own eye.
2. Place lens in position under clamp (#2) with the temples pointing toward the back. This will measure the back focal distance.
3. Turn the power wheel (#3) until both the single line and the three triple lines are all in focus together. The number on the power wheel is the sphere prescription (example +4.00).

Prescription of a sphere, cylinder, axis (+11.50, -4.00, x 97) or (+7.50, +4.00, x 7)

1. Focus eye piece (#1) for your own eye.
2. Place lens in position under clamp (#2) with the temples pointing toward the back. This will measure the back focal distance.
3. Focus the single line until it is as clear as possible, by turning the power wheel (#3).
4. Find the axis by turning the axis wheel (#4). This will be the point where you see one clear straight line.
5. Go back to the single line and adjust the power wheel (#3) for clarity if necessary. This number is then written down as the sphere component. (Black numbers are plus and reds are minus.) Also the axis reading from the axis wheel (#4) is written down. (Example - +11.50 _______ x 97)
6. Now focus on the triple lines using your power wheel (#3). The difference between your sphere (or the number you found when you focused the single line, +11.50) and the number you have found by


#1
#2
AMERICAN OPTICAL
#4
on
off
#3



focusing on the triple lines (+7.50) is your cylinder.

+11.50
- + 7.50
-4.00

Your complete prescription will read as follows:

+11.50 -4.00 x 97

It could also be written as :

+7.50 +4.00 x 7

These are the same prescriptions, just written differently.

Bifocal

Should the above prescription also have a reading segment in it, it would be called a bifocal. To check this reading segment, do the following.

1. Place the lens in position under the clamp (#2) with the temples pointing toward you. This will measure front focal distance.
2. Focus on the triple lines by turning the power wheel (#3). Mark down the number they focus in at.
3. Move the lens up to the reading segment and again focus on the triple lines. Subtract the distance from the reading segment and this will be the reading segment add.

+14.00 reading
- +11.00 distance
+3.00 add

TRANSPOSITION

(glasses prescriptions)

To transpose a lens is to rewrite the expression of its power without actually changing them.

TRANSPOSITION RULES

To transpose from one sphero-cylinder form to another:

1. Add the sphere and cylinder powers together algebraically. (If the signs are alike, add; if they are different, subtract.) The result is the sphere power.
2. Retain the power of the cylinder, reverse its sign and change the axis by 90°.

   Example: +1.00 +0.75 x 90 becomes +1.75 -0.75 x 180

   +1.00 -2.00 x 75 becomes -1.00 +2.00 x 165

To transpose a plano cylinder to a sphero-cylinder:

1. Take the power of the cylinder, retaining its sign as the new sphere power.
2. Use the same power as the cylinder power, reversing the sign and changing its axis by 90°.

   Example: Plano +1.00 x 90 becomes +1.00 -1.00 x 180

CHARACTERISTICS OF EYE DISEASES

KEY:

Category

- I. Congenital or Hereditary
  - A. Non-progressive
  - B. Progressive
  - C. Secondary Complications
- II. Adventitial
  - A. Non-progressive
  - B. Progressive
  - C. Secondary Complications

Functional Characteristics

- a. Peripheral field loss
- b. Central field loss
- c. Defective night vision
- d. Defective color vision
- e. Bright light preferred
- f. Average light preferred
- g. Dim light preferred

Physical Needs

- h. Distance glass or aid
- i. High-plus reading spectacle
- j. Hand-held lens preferable
- k. Can read without glasses
- *l. Physical activity may be restricted
- *m. May be on eye treatment or medication.

*Check with physician or opthalmologist.

CHARACTERISTICS OF EYE DISEASES

CHART

Diseases	Category	Functional	Physical
Achromatopsia	IA	d,g	h,i
Albinism, Complete	IA	f,g	h,i
Albinism, Ocular	IA	f	h,i
Amblyopia ex anopsia	IIB	b,f	h,i,m
Aniridia	IC	f,g	i,m
Aphakia, Surgical	IIA,C	f,g	h,i,l.m
Cataract	IA,B	f,g	i,m
	IIA,B	f,g	h,i,j,m
Chorioretinitis	IIA	a or b, e,f,g	i,m
Colomboma of iris, choroid or disc	IA	a.e,f	i,j
Corneal dystrophy	IA or B	e,f	i
Corneal graft, recent	IIA	f,g	h.i,l,m
Corneal scarring (trauma, keratitis, leucoma)	IIA	e,f	i
Detachment of retina Surgically treated	IIA,B	a or b, c.e,f	h,i,l.m
Diabetic retinopathy	IIB,C	b,c,e,f	h,i,j,l.m
Dislocation of lens	IA,C	f,g	h.i,l.m
Glaucoma	IB	a,c,e,f	i,j.m
	IIA or B	a,c,e,f	h,j.m
Hypertensive retinopathy	IIB	b,e,f	i,j,l,m
Keratoconus	IIB,C	a,e,f	h.i,k

CHARACTERISTICS OF EYE DISEASES (CONTINUED)

Diseases	Category	Functional	Physical
Macular degeneration			
Juvenile	IA	b,d,f,g	h,i,l
Senile	IIA or B	b,d,e,f,g	i,j
Marfan's Syndrome			
(see Dislocated lens)			
Myopia. Degenerative	IB,C	a or b, c,d,e,f	h,k,l,m
Axial	IIA	f,g	h,i,k
Nystagmus (A reflex			
associated with eye disease)	IA		
Primary Optic atrophy,			
Congenital	IA	b,c,d,e,d	i.j
Neurological	IIA,B	a,c,d,e,f	i,j,l,m
Retinitis Pigmentosa	IIB	a,c,e,d	h,i,j
Retrobulbar neuritis	IIA,B	a,b,d,f,g	i,j,m
Retrolental fibroplasia	IIA,C	a, or b, e,f	h,i,k,l
Uvelitis	IIA,B,C	e,f	i.j,m

ABSTRACT OF INFORMATION

From: Management of the Patient with Subnormal Vision, by Gerald Fonda,
C. V. Mosby. Co., St. Louis 1965.

Classification of partially seeing

Group I - Light perception to 1/200

Group II - Vision ranging from 2/200 to 4/200

Group III - Vision ranging from 5/200 to 20/300

Group IV - Vision ranging from 20/250 to 20/60

Purpose of classification is to establish an arbitrary standard for the most effective use of residual vision. Individuals in Group I should be taught braille; persons in Group II should be encouraged to read some size of type; persons in Groups III and IV should be taught to use their own eyes.

Definition of Traveling Vision

Vision of 3/200 or better if it is assumed that the peripheral field of vision is greater than 50 degrees in the widest diameter.

Eye diseases responsive to correction of subnormal vision:

1. Aniridia
2. Cataracts
3. Colomboma of the retina choroid and optic nerve
4. Mascular degeneration in younger persons
5. Progressive myopia
6. Surgical aphakia

Eye diseases that limit the correction of subnormal vision:

1. Choroidermia*
2. Diabetic retinopathy
3. Field defects
4. Glaucoma
5. Hypertensive and arteriosclerotic retinopathy
6. Optic atrophy associated with severely constricted or hemianopsia field defects*
7. Retinal vascular occlusion (severe)
8. Retinitis pigmentosa*

* These are unfavorable conditions for correction because of peripheral field defects.

Correction of Subnormal Vision

The ability to use residual vision is not determined entirely on the basis of visual acuity. The percentage method for defining visual efficiency has no scientific basis; visual acuity should not be expressed by percentage unless it is used to determine compensation.

Illumination

The following conditions function best in minimum illumination:

Aniridia

Cataracts

Central corneal opacities

Mascular Degeneration

Illumination (continued)

The following conditions function best in high illumination:

Colomboma of the retina, choroid, and optic nerve

Eye diseases associated with pinpoint pupils

Glaucoma

Healed chorioretinitis

Retinitis pigmentosa

Optic atrophy

Myopia

Surgical aphakia

Magnification

1. The vision of more than 97% of the patients with subnormal vision is improved by enlarging the retinal image.

2. Greater magnification is provided by moving the object two times closer to the eye than by increasing print size two times.

3. Non-optical magnification is more advantageous than are telescopic spectacles.

4. The use of telescopic spectacles is very limited.

   a. Telescopic spectacles placed before the patient's eyes produce visual disability greater than 50%.

   b. There is a gain of 20% in central vision but loss of 78% in periphery for a net loss of 58% in visual efficiency.

   c. Telescopic aids tend to magnify motion and distort judgement of distances.

SOURCES
FOR
AIDS

SOURCES OF LOW VISION AIDS

1. Albert Aloe Co., 805 Locust Street, St. Louis, Mo. 63101.

   Telescopes and Magnifiers

2. American Association of Workers for the Blind, Inc., 1511 K Street N.W., Washington, D.C. 20005

   Organized "workers for the blind" persons

3. American Bible Society, 1865 Broadway, New York, N. Y. 10023

   Large-print Bibles

4. American Bifocal Company, 1440 St. Clair Ave., Cleveland, Ohio 44114

   Volk Conoid microscopes

5. American Council of the Blind, 20 'E' Street, N.W., Suite 215, Washington, D.C. 20001

   "Organized Blind" group

6. American Foundation for the Blind, 15 West 16th Street, New York, N.Y. 10011.

   Best source of non-optical low vision aids.

7. American Optical Company, Southbridge, Mass. 01550

   Microscopes

8. American Printing House for the Blind, 1839 Frankfort Ave., Louisville, Kentucky 40206

   Reading Stands, large-print books, braille books

9. American Thermoform Corp., 8640 East Slauson Ave., Pico Rivera, Calif. 90660

   Braille duplication

10. Apex Specialties, 1115 Douglas Ave., Providence, R.I. 02904

    Assorted magnifiers

11. Apollo Lasers, Inc., 6365 Arizona Circle, Los Angeles, Calif. 90045

    Television magnifying systems

12. Association for Education of Visually Handicapped, 1604 Spruce Street, Philadelphia, Pa. 19103

    Organized "educators of blind" persons

13. Bausch and Lomb, 635 St. Paul Street, Rochester, N.Y. 14602

    Hand Magnifiers

14. Bernell Corporation, 316 South Eddy Street, South Bend, Indiana 46617

    Wide diversity of items

15. Braille Institute of America, 741 N. Vermont Ave., Los Angeles, Calif. 90029

    Best West Coast source of non-optical aids

16. Bushnell Optical Corporation, Bushnell Building, Pasadena, Calif. 91107

    Telescopes and binoculars

17. Christian Record Braille Foundation, Inc., 4444 South 52nd Street, Lincoln, Nebraska 68506

    Counseling services

18. Clovernook Printing House for the Blind, 7000 Hamilton Ave., Cincinnati, Ohio 45231

    Prints braille books

19. Dawn Products Company, Box 294, Owatonna, Minnesota 55060

    Study stands

20. Dazor Manufacturing Company, 4455-99 Duncan Ave., St. Louis, Mo. 63110

    Lighting fixtures and illuminated stand magnifiers

21. Designs for Vision, 40 East 21st Street, New York, N.Y. 10010

    The most complete line of telescopes and microscopes in U.S.A.

    Head-borne aids primarily

22. Donegan Optical Co., Inc., 1405 Kansas Ave., Kansas City, Mo. 64127.

Optical aids of all kinds.

23. Eberson Enterprises, P.O. Box 5516, Pasadena, Calif. 91107.

Visors and Visorettes

24. Edmond Scientific Company, 101 E. Gloucester Pike, Barrington, N.J. 08007

Unbelievably diversified offerings include some hand lenses.

25. Ednalite Corporation, 200 N. Water Street, Peekskill, New York 10566.

Stand Magnifiers and Illumination Systems

26. Edroy Products, 130 W. 29th Street, New York, New York 10001.

Magnifiers and readers

27. Eye-Bank Association of America, 3195 Maplewood Ave., Winston-Salem, North Carolina 27103

National association of 60 regional eye-banks

28. Good-lite Company, 7426 Madison Street, Forest Park, Illinois 60130

Test charts and cards

29. Go-Sees, 166 East 92nd Street, New York, New York 10028

Long canes

30. Guardian Products Company, Inc., 8277 Lankersheim Blvd., North Hollywood, California 91605

Reading stands

31. Guide Dogs for the Blind, Inc., P.O. Box 1200, San Rafael, California 94902

Guide dogs

32. Hadley School for the Blind, 700 Elm Street, Winnetka, Illinois 60093

Correspondence courses in braille.

33. G. K. Hall and Company, 70 Lincoln Street, Boston, Mass. 02111.

Large-print books.

34. Theodore Hamblin, Ltd., 15 Wigmore Street, London, W.1., England

Famous British source of telescopes and microscopes and accessories.

35. Haverhill's 526 Washington Street, San Francisco, Calif. 94111.

Sophisticated accessories, including pocket telescopes and telescope/microscope combination.

36. House of Vision, Inc., 135-37 N. Wabash Ave., Chicago, Illinois. 60602.

Complete line of all kinds of low vision aids.

37. Howe Press, Perkins School for the Blind, 175 North Beacon Street, Watertown, Mass. 02172

Non-optical aids.

38. Industrial Home for the Blind, 57 Willoughby Street, Brooklyn, New York 11201

Much informational material regarding low vision and its ramifications - no aids.

39. International Business Machines, Office Products Division, Parson's Pond Drive, Franklin Lakes, N.J. 07417

Braille typewriters.

40. B. Jadow and Sons, Inc., 53 West 23rd Street, New York, New York 10010

Industrial magnifiers.

41. Jardon Plastics Research Corporation, 905 Kales Bldg., Detroit, Michigan 48226

Ready-made, High plus, spectacles

42. Keeler Optical Products, Inc., 5536 Baltimore Ave., Philadelphia, Pa. 19143

British low vision aids.

43. Keystone View Company. 165 Market Street. Meadville, Pa. 16335

Miscellaneous devices.

44. Kono. Division of Beatrice Foods Co., 4248 Dorchester Road, Charleston Heights. South Carolina 29405

Pinhole spectacles and custom-designed frames.

45. Large-Print, Ltd., 505 Pearl Street, Buffalo, New York 14202

Large-print paperbacks.

46. Lions international. York and Cermak Roads, Oakbrook, Illinois 60521

Administrative headquarters.

47. Library of Congress, Division for the Blind and Physically Handicapped 1291 Taylor Street, N.W. Washington, D.C. 20542

Talking and braille books.

48. Magna-Add, Inc., 150 E. Broad Street. Columbus, Ohio 43215

Clip-on bifocals.

49. May Manufacturing Corporation 32-38 62nd Street, Woodside. New York 11377

Loupes, magnifiers, and pinhole spectacles.

50. McLeod Optical Company, 357 Westminster Street, Providence, R.I. 02901

I-gard lenses and Hyperocular microscopes.

51. National Accreditation Council, 84 Fifth Ave., New York, New York 10011

Accredits all "aid to blind" agencies.

52. National Aid to the Visually Handicapped, 3201 Balboa Street, San Francisco, California 94121

Large-print books.

53. National Center for Deaf-Blind Youths and Adults, 105 Fifth Ave.,
New Hyde Park, New York 11040
Rehabilitation programs for deaf-blind persons.

54. National Electric Instrument Company, 92-21 Corona Ave., Elmhurst.
New York 13373
Near-point telescopes.

55. National Federation of the Blind, 524 Fourth Street, Des Moines,
Iowa 50309
"Organized Blind" group.

56. National Industries for the Blind, 50 West 44th Street, New York,
New York 10036
Sells blind-made products

57. National Society for the Prevention of Blindness, 79 Madison Ave.,
New York, New York 10002
Blindness prevention campaigns.

58. New Era Optical Company, 17 Wabash Ave., Chicago, Illinois 60690
Hand and stand readers and magnifiers.

59. New York Association for the Blind, 111 East 58th Street, New York,
New York 10022
Non-prescription optical aids.

60. New York Times, 229 West 43rd Street, New York, New York 10036
Large-print newspapers.

61. Nieman-Marcus, Main-Ervay and Commerce, Dallas Texas 75201
Specialty (high priced) items.

62. Opaque Systems, Ltd., 100 Taft Ave., Hempstead, New York 11550
Projection magnifiers, CCTV, stand magnifiers.

63. Optical Sciences Group, Inc., 2201 Webster Street, San Francisco, Ca. 94115
Fresnel lenses and prisms.

64. Perkins School for the Blind, 175 North Beacon Street, Watertown, Mass. 02172

Residential school for deaf-blind children.

65. Plastic Contact Lens Company, 18 South Michigan Ave., Chicago, Illinois 60603

Contact lens telescopes.

66. Policoff Laboratory, 68 Franklin Street, Wilkes Barre, Pa. 18701

Policoff and Bechtold telescopes and microscopes.

67. Practical Aids Co., Estacada, Oregon 97023

Reading stands and typewriter copy holders

68. Reader's Digest Publishing Company, Inc., Pleasantville, New York 10570

Large-print periodical.

69. Replogle Globes, Inc., 1901 North Narragansett Ave., Chicago, Ill. 60639

Reading stands.

70. Robinson-Houchin, Inc., 1266 Dublin Road, Columbus, Ohio 43215

High-add, one-piece (Hyray) bifocals.

71. Science for the Blind, 221 Rock Hill Rd., Bala-Cynwyd, Pa. 19004

Technical and scientific periodicals on tape.

72. Seeing Eye, Inc., P.O. Box 375, Morristown, N.J. 07960

Guide dogs.

73. Selsi Co., 40 Veterans Blvd., Carlstadt, N.J. 07072

Diversified line of lower cost optical aids, telescopic and microscopic.

74. Shuron-Continental Optical Co., 40 Humboldt Street, Rochester, N.Y. 14609

Ultex Hi-power Bifocals.

75. Sleep-Shade Company, P.O. Box 968, 828 Mission Street, San Francisco, California 94103

Blindfolds and ear-plugs.

76. Louise Sloan, Wilmer Ophthalmological Institute, Johns Hopkins University, Baltimore, Maryland 21205

Stand magnifiers and large-print near-point targets.

77. Stanwix house, Inc., 3020 Chartiers Ave., Pittsburgh, Pa. 15204

Large-print books.

78. Stocker and Yale, Inc., Route 128 and Brimbal Ave., Beverly, Mass. 01915

Fresnel magnifiers.

79. Superior Optical Company, P.O. Box 15346 De Valle Station, Los Angeles, California 90015

Typoscopes.

80. Telephone Pioneers of America, 195 Broadway, New York, New York 10007

Repair "talking bokk" machines.

81. Telesight Co., 150-57 Hoover Ave., Jamaica, New York 11432.

Diversified line of optical low vision aids.

82. Ulverscroft Books, Oscar B. Stiskin, P.O. Box 3055, Stanford, Conn. 06905

Large-print books.

83. Universal Ophthalmic Products Inc., 2714 Louisiana, P.O. Box 3144, Houston, Texas 77001

Cataract spectacles, "press-ons".

84. U.S. News and World Report Talking Magazines, 2300 N Street, N.W., Washington, D.C. 20037

Recorded periodical

85. Visorette P.O. Box 5185, Pasadena, California 91107

Visors and sun-shades.

86. Visualtek, 1830 Lincoln Blvd., Santa Monica, California 90404

CCTV readers.

87. Watchemoket Optical Co., 232 W. Exchange Street, Providence, R.I. 02903

Shields and non-optical specialties.

88. Western Optical Co., 1200 Mercer Street, Seattle, Washington 98109

Head-borne loupes and auxiliary testing devices.

89. Xavier Soceity for the Blind, 154 East 23rd Street, New York, New York 10010

Braille and talking books.

90. Younger Manufacturing Company, 3788 South Broadway Place, Los Angeles, California 90007

Aspheric stand magnifiers.

91. Carl Zeiss Co., 444 Fifth Ave., New York, New York 10018.

Diversified line of low vision optical aids.

92. Local stationary and department stores.

93. Local optical laboratories.

ADDENDA TO "SOURCES OF LOW VISION AIDS" WITH AIDS

50A. MKM, Box 989, Rapid City, South Dakota 57701

Reading stands.

57A. Wm L. Nelson, O.D., 353 'H' Street, Suite C, Chula Vista, California 92010

Typoscopes.

61A. Nu-Vu Products Company, 45 East Lockwood Avenue, Webster Groves, Montana 63119

Writing paper and tactual materials.

62A. Ophthalmos, Inc., 724 St. Louis Road, Collinsville, Illinois 62234

Cataract viewer.

63A. Oregon Commission for the Blind, 535 S.E. 12th Avenue, Portland, Oregon 97214

Services of all kinds.

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3. Ophthalmic Assistant, The, Stein and Slatt. 1968, Mosby Publishers, St. Louis.

4. Subnormal Vision, Bier. Butterworth Publishers.

5. Subnormal Vision, Management of the Patient With, Fonda Gerald. C.V. Mosby Company, St. Louis, 1970.

6. Truth About Your Eyes, The, Derrick Vail, M.D. Farrar, Straus and Cudahy, (CW 1950), New York, New York.

7. Vision of Aging Patient,. Hirsch and Wick. Published by Schedon.

8. Visual Fields, The, David O. Harrington, A.B., M.D. CV Mosby Company, St Louis. (1964 copy)

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